



World Petroleum Congress 2014

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Thank you Dan and good morning everyone.

Thank you for the invitation to join this great event – bringing our energy industry together from all across the globe.

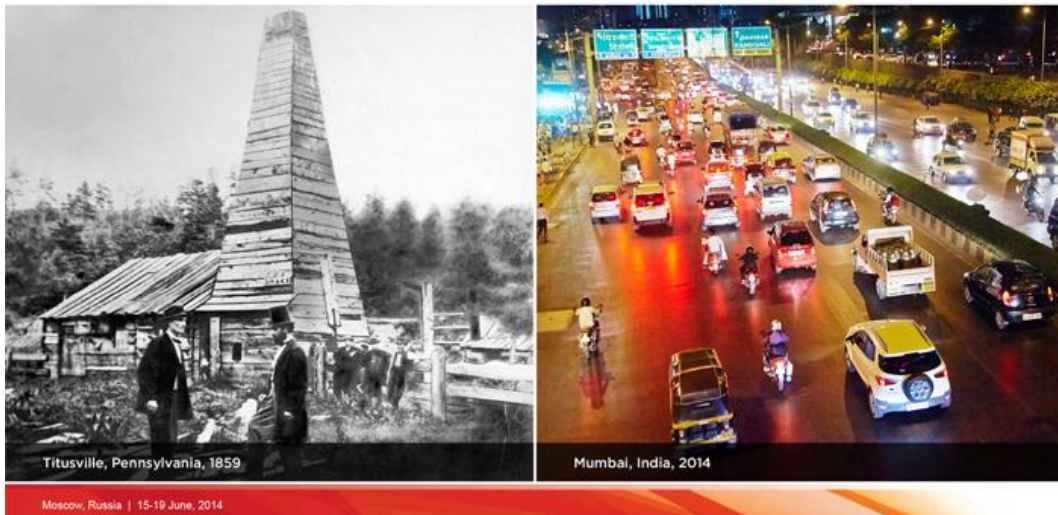


It's been good to renew old friendships and to meet new people and - and we have been very busy in BP's pavilion.

You may have seen it. It says 'Pioneers welcome'. In this business we're all pioneers – so you're all welcome!

I'm also very grateful for the chance to participate in this particular debate because it reminds us what our industry is really here for.

The industry's record - energy driving development



Let's just look back for a moment before we look forward.

For 100,000 years, people lived without using fossil fuels at any kind of scale.

Then suddenly everything changed with the industrial revolution. Dan put it really well in his book *The Quest* – where he wrote: “Humanity had broken the bonds that had been set by the muscles of man and beast.”

And it was energy that broke those bonds. There was the invention of the steam turbine, the development of electricity and of course the discovery of oil.

By the way, the modern industry is often dated to Colonel Drake's well in Titusville, Pennsylvania in 1859.

The industry's record - energy driving development



But if you go to Azerbaijan they'll remind you that a successful well was drilled there in 1848 – and that was by a Russian engineer, FN Semyenov.

That's an image from those early days – also early days for photography!

And the revolution is still going on. Energy is still helping to lift millions of people out of poverty each year.

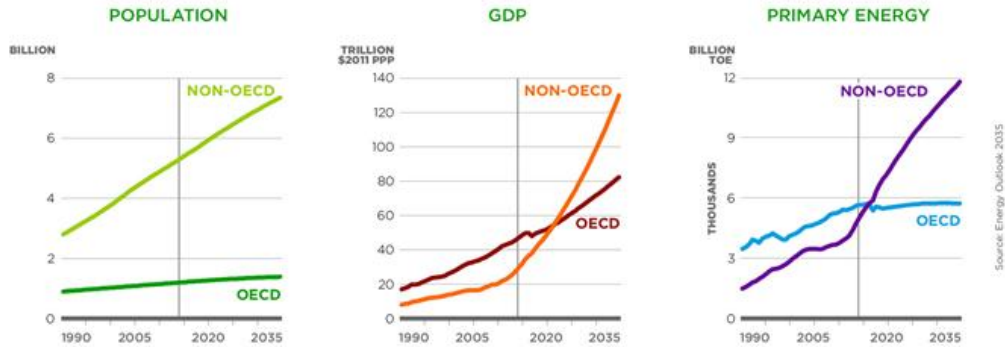
The world has achieved the first Millennium Goal that was set by the United Nations in 2000 - to halve the number of people who live on less than \$1.25 a day from the 1990 level.

It is no coincidence that during that time - while poverty fell - the consumption of energy rose from around 8 billion tonnes of oil equivalent a year in 1990 to 12.7 billion last year.

By the way, that figure is hot off the press from BP's Statistical Review of World Energy which we launched here yesterday.

In some cases, our industry has played a direct role in development – supporting education, local economies and even healthcare in places where we work.

The industry's challenge - meeting future demand



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Looking at the broader picture, this slide sums up the problem our industry has to solve.

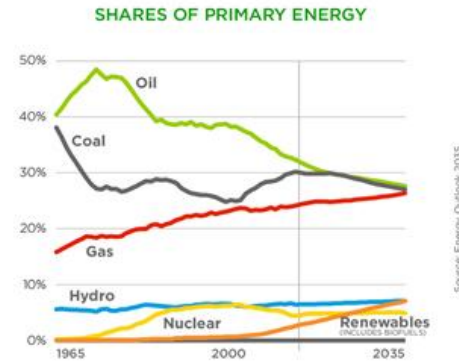
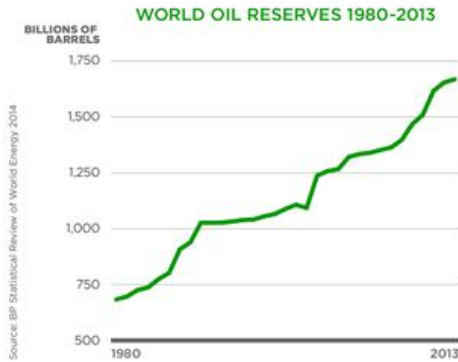
First, the population is growing. Today the world has around 7.5 billion people. By 2035 it will have around 9 billion.

Second, economies are growing. Global GDP has been increasing on average about 3.5% a year since 1970 and we expect that to continue up to 2035.

And third, energy consumption is growing. In the next two decades we expect the volume of energy that the world consumes to go up by about 40%.

That's around 37 billion barrels worth. The additional oil alone adds up to around 6 billion barrels. If you stacked them on end they would stretch to the moon and back five times.

Investing to meet demand - the right resources below the ground



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So what do we need to meet demand on that scale? Putting it simply I'd say three things.

First you need the right resources below the ground.

Then you need the right conditions above the ground.

And then you need the investment from our industry.

So let's look at those in turn.

In terms of resources, we're in a good place.

New sources of supply are opening up all around the world – shale oil and gas, tight oil and gas, more deepwater oil and gas – a great specialism for Petrobras and for BP of course - and in time we will also have Arctic oil and gas. I think the debate on peak oil has itself peaked now.

And the industry has proved itself capable of more than replacing the reserves that are produced.

When I started in this industry the world's proved reserves of oil for example amounted to around 700 billion barrels, Since then we have consumed more than that – around 900 billion – but the reserves have grown today to nearly 1700 billion.

So the resources below the ground aren't an issue; but what about the conditions above the ground?



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First of all we need investors who are prepared to provide the capital for energy production.

And energy faces competition for investment capital from telecoms, pharmaceuticals, IT and other sectors.

This is particularly important for the international oil majors like BP. We have invested a lot of money since the big mergers of the late 1990s. We've been building global portfolios and investors are now demanding certain things.

They want strict capital discipline. They want us to make the right calls and stick to our budgets.

They want us to keep actively managing our portfolios to keep up their quality.

And they want us to execute with great efficiency – and of course with safety as the top priority.

Turning to governments and policy-makers, they have a significant part to play in creating the conditions for investment to flourish. Countries are competing for investment and the investment tends to flow to places where the operators can be fairly sure they will experience open access, open markets, fiscal stability and fair regulation – and that will continue over time.

Investing to meet demand - the capital curve



So if the investors are on board - and the policy conditions are good – then it's down to us. It's the industry's job to find and produce the resources.

This slide shows the capital life cycle of a typical upstream energy project. It starts with some initial investment in seismic imaging to see what reserves might exist. Then the spending goes up as we drill exploration and appraisal wells.

Then there is a pause for assessment. Then, if we go ahead, we do the front end engineering design. And then the investment really ramps up with the engineering, procurement and construction.

After that the spending rate comes down as we start up production and move into the operations phase. But capital spend continues through the life of the project because we have maintenance and turnarounds to complete – sometimes new extensions - and then eventually we see the operation decommissioned.

Of course this is just the upstream cycle. The oil and gas we produce then moves on to refineries, pipelines and ships and these have their own life cycles.

The whole upstream cycle can last half a century or more. Samotlor marks its 50th anniversary next year for example. And the first seismic was shot in the North Sea 50 years ago this year.

Looking ahead, we know many of today's projects will last well into the second half of this century.

So how will these projects act as a force for development?

Well, firstly they will provide the energy for continuing industrialization and growth.

They will also provide jobs. We estimate that the industry supports around five million jobs in the oil, gas and refining industries worldwide.

But in the few minutes I have left, I'd like to focus particularly on how energy can help drive development through technology.

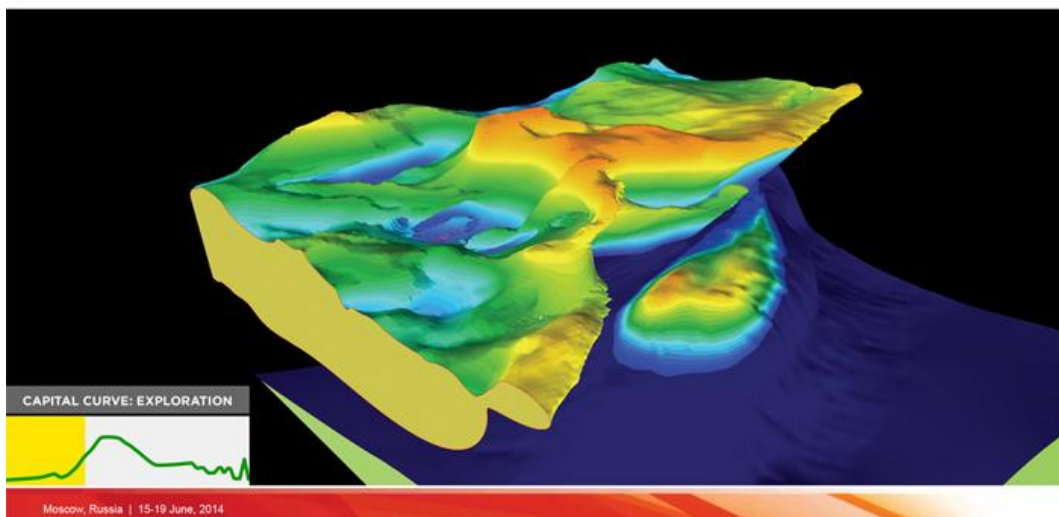
High technology industries act as engines of development in many different ways.

For example, the internet has changed the way we work. It has helped us do things faster and more thoroughly. And it's introduced new skills into the global economy.

The energy industry, by contrast, is often seen as an old fashioned sector. But nothing could be further from the truth.

This is a modern, high tech business. In fact I believe our industry is experiencing its own technological revolution right now. Things are possible that weren't dreamed of a decade ago. And in the next decade I think we'll see even more innovation.

Investing to meet demand - exploration and technology



Look at the way we're exploring today. 3D and 4D seismic were game changers a decade or so ago. In BP's case, they helped us find previously hidden fields in the Gulf of Mexico, Angola and elsewhere.

Today's revolution is in the computing power we use to analyse our seismic data. In BP we have built the world's largest supercomputer for civilian research to help crunch the numbers. The computer has over 2 petaflops of capacity – enabling it to perform some two million billion calculations per second. I assure you, that is a lot! That means an assignment that would have taken a geoscientist 4 years a decade ago, now takes just one day.

Investing to meet demand - development and technology



Moving onto the development phase, here I think we're going to see a lot of innovation in the next few years, particularly in the materials we build facilities from.

Scientists have made rapid advances in imaging - from the macro scale right down to the atomic level. This is providing fundamental new insights and opening up possibilities for self-healing coatings and new types of alloys that will help us work at greater depths and pressures.

The potential is so great that our company is investing \$100 million in the BP International Centre for Advanced Materials – enlisting some of the world's best materials scientists to support our industry.

That centre is based at Manchester University but draws in other universities and experts from around the world.



Technology is also transforming production. For decades, we have accepted that most of the oil in a field will not be recovered. Looking ahead I think we will expect the opposite because of the increasing power of enhanced oil recovery.

One example is Prudhoe Bay in Alaska where we have developed a series of gas and water injection techniques and we're now targeting a 60% recovery factor. When production started in the 70s we thought it would reach around 9.5 billion barrels. Today we've produced 12 billion barrels and we're still going strong.

It takes time to test enhanced oil recovery – or EOR - technologies and so far they have usually been applied to older fields. However we now have plans to deploy our low salinity waterflooding technology called LoSal® EOR from day one at Clair Ridge in the UK in a couple of years' time. We expect to unlock around an additional 42 million barrels of oil there at an additional cost of just \$3 per barrel. In fact that project won a Distinguished Achievement Award at the Offshore Technology Conference last month. Great work by the team.

And those numbers also remind us of something important about technology. We don't do it for the 'wow factor'. We do it because it helps us compete and deliver value.

Investing to meet demand - safety and technology



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Technology also has a big role to play in safety and risk management.

One example is a new tool that we call BP Well Advisor. It provides a series of consoles that you could call 'dashboards for drillers'.

These collect all the data that is picked up by sensors and other equipment during drilling operations and bring it together on the same screen, in real time, using tables and diagrams.

Investing to meet demand - safety and technology



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One console, for example, shows the blow-out preventer and it includes traffic light signals – green, orange or red – that show the state of health of each component of the BOP.

By the way, if you drop into the BP pavilion you can see these and other technologies in more detail and talk to the people who use them.

Investing to meet demand - the opportunity for Russia



Let me add a quick word on Russia because I think the energy sector in this country has a very exciting future.

Leaders in Russia have spoken of the need for Russia to have an economy that harnesses modern technology. And that doesn't just mean IT, pharma and chemicals.

It means energy. Energy – the greatest Russian industry of them all – is today very much a high tech industry and the combination of world-class innovation and Russia's vast energy reserves is formidable one.

I have the honour and responsibility of sitting on the board of Rosneft where innovation is seen as critical to the company's development.

The business has an innovative development programme aimed at making Rosneft a leading high technology energy company – from exploration right through to refining and the IT systems used in the downstream.

I'm very pleased that Rosneft and BP have recently agreed to work together to explore prospects for unconventional oil and gas production in the Domanik formations. That's in

the Orenburg region of the Volga-Urals. I think the potential for unconventional production in Russia is enormous – including bringing new life to mature areas such as this one.

Investing to meet demand- the right people



So energy has driven development and will continue to do so, here in Russia and around the world.

It will require the industry to choose the right projects and demonstrate capital discipline. It will require policy-makers to provide the right conditions for investment. And it will require operators to harness the full power of technology.

But there is one other factor - the human factor. Look around this room and just think about the collective capability represented here. And then think about how many of us will still be at the WPC in 10 or 20 years' time.

The industry is facing a great crew change and we need to attract more talented young people into the business.

I think we can do that by highlighting the role of energy in development – and the role of technology in energy. We should be saying this....

First do you want to work in an industry that changes lives – one that brings people out of poverty as well as driving growth and creating jobs?

And second do you want to work in an industry that does this by taking the very latest technologies – supercomputers, advanced materials, nano-science and bio-science – and deploying them at exciting new frontiers all around the world.

If you do, then come and join us. Because this is an industry that says ‘Pioneers, welcome’.

