



# Modernising our industry

Bernard Looney  
Chief executive, Upstream

---

14 September 2017





Bonjour. Good morning, everyone.

I think it was Audrey Hepburn who said, “Paris is always a good idea” and I agree 100%.

It is a great privilege to be here in this magnificent setting and at such an inspirational event.

In BP, we have enormous respect for Schlumberger as a business and as a partner.

The company has been at the leading edge of innovation for over a century – ever since Conrad and Marcel Schlumberger conducted their first experiments in subsurface mapping in Normandy in 1912.

And Schlumberger has continued to be a pioneer throughout the industry’s evolution, not only in developing the cutting-edge technologies we see today, but in becoming one of the first truly global companies - and leading the way in building a culturally diverse workforce.

It is not surprising that people say: “Where the drill goes, Schlumberger goes”. And BP has certainly benefitted massively from working with Schlumberger over many years, in many countries and many projects.

This morning, in the interests of time, I want to focus our thoughts on three topics

- First, the context, the extraordinary combination of forces facing our industry today;
- Second, the response, explaining how we in BP are acting to protect and grow our business in these unprecedented times;
- And third, the role of digital technology, which is coming of age in our industry at exactly the right moment.

## Context

In terms of context, I would identify six forces that are combining to change our world – and many much faster than we think:

- First, population and economic growth;
- Second, abundant energy resources;
- Third, the climate challenge;
- Fourth, the increasing competitiveness of renewable energy;
- Fifth, the evolution of government policy and priorities;

- and sixth, the new industrial revolution, that is the fusion of the digital and physical worlds.

Let's look at the first of those forces – population and economic growth. When I was born, the world population was around four billion. Today it is seven and a half.

By the time this 30-minute session ends, nearly 8,000 babies will have been born and around 3,000 people will have died worldwide.

That means almost 5,000 more people who will need heat, light and mobility – things that many of us take for granted.

What is more, rapid growth in successful developing economies, led by China and India, is leading to increasing prosperity and economic growth.

We expect around two billion people – a quarter of the world's population – to be lifted from low incomes to middle incomes over the next 20 years.

And as prosperity increases, so too does the demand for energy. That's why we project a 30% rise in energy demand over the next two decades.

These are striking numbers. But even more striking are the ones that demonstrate how we can indeed provide all that energy - and then some.

This is the second big force that is changing our world.

When I joined this industry in 1991, global oil reserves stood at around 1,100 billion barrels. Since then the world has consumed nearly 800 billion barrels. Yet the reserves have not gone down. Instead, they have gone up by around 600 billion barrels.

We have constantly found more oil than we can use.

We have moved from scarcity to abundance.

Wallace Pratt, the pioneering American geologist, famously said that oil is found in the minds of men. However, for a few decades, it seemed that the opposite happened. We became convinced in our minds that oil was scarce.

It took the shale revolution to finally demonstrate that there really was enough energy in the ground. And not just enough, more than enough.

We have estimated that today's technically recoverable oil resources amount to around 2.5 trillion barrels. That is more than enough to meet the expected global demand out to 2050, twice over.



And while hydrocarbons are abundant, the overall energy mix is changing fast, in part driven by efforts to meet the climate challenge. This the third big force.

By the time I sit down, the world will have emitted at least another two million tonnes of CO<sub>2</sub> - and that rate is too high to meet the goals that were set here in Paris nearly two years ago at the UN climate summit.

The growth of carbon emissions is slowing, but the science underpinning the Paris agreement shows that they actually need to fall - and fall significantly - if the world is to meet the goal of keeping the rise in global temperatures to well below two degrees on pre-industrial times.

The good news for society is that help is at hand from the fourth major force that is having an impact on our sector. And this is the growth of renewable energy – something else that we have consistently underestimated.

The World Economic Forum has reported that renewables have now reached competitive parity with hydrocarbons in around 30 countries.

Last year oil consumption grew 1.6%. Gas grew 1.5%. And renewables grew 14%. Every 30 minutes, roughly another 4 megawatts of solar and 3 megawatts of wind capacity are installed.

This is not to say renewables are going to replace hydrocarbons in the short-term. Oil and gas are not going away anytime soon.

In fact, looking across a broad range of external forecasts, the vast majority expect global oil demand to be in excess of 85 million barrels a day in 2040.

What is changing, however, is the mix – and the fact that there will increasingly be much more competition from renewables.

The fifth big force affecting our industry is the way that governments are acting for new reasons to reduce dependence on oil and gas. Once it was America that sought to wean itself off oil consumption. Today, it is major oil producing countries who see that they cannot depend on oil revenues forever and are seeking to diversify their economies. In Saudi Arabia for example, the recently announced goals for 2030 include increasing non-oil government revenue six-fold in 15 years.

The sixth and final force to mention is the new industrial revolution that is following those based on steam, electricity and automation.

Some have termed this the ‘fourth industrial revolution’ because it is the fusion of the other three. It is cyber-physical, linking hardware and software, for example by monitoring and controlling equipment via sensors and by orchestrating assets through the Internet of Things. And of course, Schlumberger are a leading force in the effort to connect physical and digital worlds in the energy sector.



By the way, also during this session, there will be around 5 billion emails sent and 5 million Skype calls made. The good news is that we are avoiding all of them. Although I do suspect one or two emails may have been sent or received in this hall.

So, what does all this mean?

Many might see this unprecedented combination of forces as a threat.

But I do not. I see opportunity. For those who will change – and not all will – technology, and digital technology specifically, offers a powerful new way to adapt and thrive in this new world.

This is a once-in-a-generation change. We are all in it together, operators like BP, suppliers like Schlumberger – and we need to face it together.

In this new world, we cannot rely on incremental change. We need to undertake transformational change.

We cannot simply hope that prices will recover and the old days will return.

We must accept the new realities with honesty, humility and accountability.

I know we are all grappling with this issue so let me explain briefly how we in BP Upstream are approaching it.

## Modernisation and transformation

We have embarked on a programme of modernization and transformation. The top priority and the cornerstone of that programme is of course safety - where we remain committed to making all necessary investments.

The programme then has three pillars, together designed to enhance operating performance and improve capital efficiency.

The first is agility. That means improving and simplifying the way we operate;

The second is mindset change. That means accepting the reality and adopting the right attitude for a business that is increasingly competitive and margin-dependent.

And the third is digital transformation - digitising and automating our work.

And today, given the focus of this event, I want to concentrate on that digital dimension.

It is interesting to reflect that it was technologies such as seismic imaging and hydraulic fracturing that helped to deliver the extraordinary abundance of energy resources that we have today – in many ways creating our own challenges.



However, digital technology now offers us new ways to address those challenges and prosper in a very different business environment.

In BP, we have used digital technology for decades, but the focus now is on harnessing it for profound and transformational change, across the business.

We have a vision. And that vision is to be the leading digital Upstream company, comprised of globally connected networks of physical equipment, people and digital processes.

We call that vision The Connected Upstream.

Let me explain briefly how we are working towards that vision. Broadly speaking, there are four areas of activity.

The first is intelligent monitoring. We now have more than 2000 kilometres of fibre optic systems linking our offshore operations to onshore monitoring centres as well as other systems that constantly assess equipment to detect potential faults and avoid costly maintenance later.

One example is the acoustic system used to mitigate sanding in the Caspian ACG field. Each hour we record a terabyte of data using such systems. That is like downloading 1,000 Netflix films at the same time.

Second, and closely related, is system optimisation. We use a tool called Apex to simulate and optimise production 24/7 by modelling physical constraints and adjusting flows accordingly.

The third area for digital investment is predictive analytics, where we are using a cloud-hosted wells data platform called Argus. This contains data on 2,500 wells and has transformed the way our petroleum engineers work. It provides a single source of data to assess individual wells and also to compare them and learn from experience elsewhere.

All of this is underpinned by a growing digital foundation, including a data lake of over a petabyte – roughly equivalent to 20 million filing cabinets or four Libraries of Congress. Each day a billion data records from our operations are pumped into the data lake. That is roughly double the daily tweets on Twitter.

And this programme – the digital and the human aspects together – has made a difference. Over the last few years we have seen safety improve. Unit production costs are down 33% on 2013. Cash and capital costs have come down \$9bn in 3 years. Our base production decline was 1% last year instead of the originally expected 3 to 5%. Plant reliability has risen 11% to 95%. And we are growing, with seven major new projects coming on stream this year, contributing to our plans to increase production by 800 thousand barrels a day over 5 years to 2020.

## Schlumberger partnership



This is very much a dynamic programme of action and we are constantly looking for new opportunities to use technology to transform our work.

And right now, we are privileged to be working with Schlumberger to take digital transformation into the area of well construction planning and execution for the industry.

We have made great strides through applying big data, analytics and optimisation in areas such as seismic imaging, production and monitoring facilities.

But until now, well construction has not been in the spotlight. It is still frequently carried out in very old-fashioned ways with engineers in different locations shifting designs around by email.

However, that is changing. Schlumberger have acted with their characteristic creativity to identify this gap in the industry's digital environment and find a way to fill it.

As some of you will have seen here in Paris, they have now launched the DrillPlan solution which integrates and automates the well-planning process – including the design of trajectory, casing and all the other elements.

We are privileged to be Schlumberger's strategic partner on DrillPlan and also on a future execution solution focused on the actual drilling of the well.

These solutions are digital technologies that automate the entire process from design to build within a single environment that contains all of the data and information needed.

Engineers are released from writing and reviewing and can instead add value by checking, optimising and innovating, collaborating around the world using a single virtual workspace.

Our aspiration is that this solution will initially reduce cycle times and improve our learning and knowledge management. In time, we also expect to see lower well costs and greater organisational productivity

It will bring more flexibility, agility and learning to our engineering and operations teams. It will integrate the people involved as never before. And it promises to improve performance, mitigate risk and prevent failure.

We are looking forward to piloting these solutions in our work to develop the giant Khazzan field in Oman. It is a great test-bed because we are drilling a high number of wells there and can realize the benefits of well-on-well improvements.

And group-wide, this is a great addition to the work our wells team are already doing to integrate engineering and operations, automate rigs and add value through remote operations, smart downhole tools and a series of apps.

## Conclusion



So, the half hour is nearly up. 7,000 of the 8,000 babies have already arrived.

We are also seeing the birth of a new era in the energy industry. It is being shaped by six powerful forces – population growth and increasing global prosperity; abundant resources; the effort to tackle the climate challenge; competition from renewables; changing policies; and the revolution that is integrating physical and digital technology.

Our industry is responding. In BP, that starts with safety and includes increased agility, a fresh mindset and widespread digitisation.

Digital energy is still in its infancy. Advances in areas like AI, robotics and quantum computing will bring changes that we can only guess at.

But it is not the technology alone that will create our future. It is our readiness to embrace it. It is our ability to adapt to meet unexpected challenges and seize unexpected opportunities.

In other words, it is really about us, our courage and our leadership.

The 15th century French trader and entrepreneur Jacques Coeur said: “À vaillant coeur, rien d'impossible.” “For a brave heart, nothing is impossible.” I think that is a good motto for all of us and a good thought to end on. Thank you.