

**39th Annual Engineering and
Construction Contracting Conference**

**Facing the future:
What will it take to succeed in a new energy era?
Tony Meggs, BP**

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Thank you for that introduction. It's a great privilege and a pleasure to be with you here today.

As most of you are well aware, the energy industry is highly capital intensive and major projects are our life-blood. Many of you in this room are deeply involved in the great challenges that comprise our industry today, so I speak to you with pleasure, but also with a certain sense of humility and apprehension.

As you would hope and expect from a company that's been around a long time, we in BP have given a good deal of consideration to the question of what the energy business might look like in the future, and what we need to do to survive and thrive in the new environment.

In the short time we have available, I'd like to focus on the challenges and opportunities facing the project community in today's fast moving energy business and to suggest some ways that we might address those challenges – with a particular focus on the higher levels of collaboration I believe will be essential for a successful future.

I want to start by looking at **pace** - a topic close to the hearts of all project leaders and their teams.

The pace of change in our industry is very fast right now.

The politics of energy are changing fast – energy security and climate change considerations are driving the quest for more diverse, more local, and cleaner energy solutions. Energy is now right at the top of the political agenda. Given the fundamental importance of energy, it has always had a strong political dimension. But now more than ever in our history, the future of our industry will be shaped by government policies addressing critical issues of climate and energy security

Energy demand is changing fast – Most forecasts project that by 2030, energy demand will grow by around 50%, a staggering figure. We should be in no doubt that this is generally a good thing – access to energy is absolutely essential to lifting hundreds of millions of people out of poverty and giving them a better life. But it also creates issues which must be addressed.

Energy supply is changing fast – with new production coming from areas like the arctic and ever deeper water, and from so-called unconvensionals such as tar sands. Not to mention the massive amount of new money and, perhaps more importantly, of new talent that is pouring in to the field of alternative energy. We see growing diversification in the sources of supply, both fossil and non-fossil based, as industry and governments grapple with the issues of energy security and climate.

Technology is also changing fast – creating new routes to energy production, transportation and consumption. Technology plays an essential part in addressing almost all the challenges we face, and I am pleased that BP is very active here. We're collaborating with some of the world's smartest scientists and engineers to create energy technologies for the future.

All of which means that we will need to stay on our toes if we are to remain leaders in the energy business.

No companies will be able to address all these challenges alone. I believe we need to find more sophisticated ways of working together to deliver

what governments, businesses and consumers are looking for – safe, clean, secure and accessible energy.

So what do we already know about the future?

We know that conventional fuels will continue to supply the lion's share of the world's energy needs for decades to come. But these resources are becoming harder to find and develop, forcing us into ever deeper waters and more hostile environments. Continuous technological progress is essential to allow us to enter these new environments.

Technology is also enabling us to produce more from what we have already discovered, leading to significant improvements in recovery rates from existing oil reservoirs.

As just one example, if you look at the history of our Prudhoe Bay operation over a period of 30 years, advances in the application of horizontal drilling, coiled tubing drilling, miscible gas injection, and other technologies have driven BP's original estimate of 40 per cent oil recovery up to 60 per cent. And I have little doubt that number will continue to increase in the future.

New deep reservoir investigation techniques will increasingly give us the ability to track oil, gas and water underground. Oil fields will one day become a digital virtual reality, allowing us to evaluate far more accurately where oil is left in the reservoir and how to extract it.

We are increasingly using land seismic technologies to find the best well locations to unlock tight gas in the USA, North Africa and the Middle East.

We are drilling and completing ever more complex and sophisticated wells, whilst working all the time to minimise BP's environmental footprint.

All these and many more technological advances will enable us to carry on extracting oil and gas for many years to come. Working our existing reserves harder, and accessing new resources, including significant reserves that are yet to be discovered.

Alternative energy technologies increase in importance

But whilst fossil fuels will continue to dominate the market for the foreseeable future, alternative energy technologies are becoming increasingly important.

There are three major thrusts:

1. Renewable energy, in the form of wind, solar and bio products
2. Conversion technologies which allow the transformation of multiple low cost feedstocks, such as coal and petcoke, into a variety of energy products
3. Carbon sequestration, particularly in the subsurface, which allows for the decarbonisation of carbon intensive fossil fuels

At BP, we have announced a collaboration with Associated British Food and DuPont to build a world-scale bio-ethanol plant and a new bio-butanol demonstration plant in Hull in the UK.

Here in the US we are partnering with Mendel Biotechnology of California to develop new feedstocks for the emerging bioenergy market.

In BP Solar, we are focussing on a new silicon growth process technology, Mono2, that significantly increases cell efficiency over traditional multi-crystalline-based solar cells.

And we are working with Caltech to explore a new way of producing solar cells, based on the growth of silicon on 'nanorods' as a way of making solar electricity more efficient.

With projects like these, we are expanding our operations and diversifying into activities that take us well beyond our conventional base. They pose many new challenges for us, not just in the technologies themselves but also in developing new relationships with partners and disciplines that we have not traditionally embraced.

Hydrogen energy

There is another new area I would like to mention here which, perhaps more than any other, illustrates the fundamental way in which our industry partners will change over time.

It is in the field of what we call “hydrogen energy”.

As some of you will know, BP has set up a joint enterprise with the international mining group Rio Tinto and a technology alliance with General Electric to develop decarbonised power projects around the world. We are focusing initially on hydrogen-fuelled power generation, using carbon capture and storage technology to produce new large-scale supplies of almost carbon-free electricity from traditional fossil fuels.

These large and complex projects are bringing together three quite distinct sectors: the chemical industry – to turn high carbon low cost feedstocks into CO₂ and hydrogen; the power industry - to convert the hydrogen into electricity and deliver it into the grid; and the upstream industry – to sequester the CO₂ in the subsurface. And all of this must be done in partnership with government to create the appropriate regulatory environment, and with the public to create confidence in the safety and security of these technologies for widespread application.

These types of future projects will require us to attain higher levels of collaboration and co-operation than anything we have experienced before.

Increased complexity

Hydrogen energy is one good example of future complexity, but we also see it in our current operations.

Take for example BP's Thunderhorse project in the Gulf of Mexico. The largest drilling and production semi-submersible ever built, tapping into a reservoir lying some 6000 meters beneath mud, rock and salt, topped by 1900 meters of ocean. Pressures over 1200 bar and temperatures of 135 degrees C. Everything about this project is pushing the limits of the industry's experience. And it has been very challenging. Probably the toughest project of its type we have ever undertaken. It will work, and it will open up a whole new province for us. But it illustrates how the challenges are getting tougher and the risks are getting bigger.

Then there is the complexity involved in developing new unproven technologies, with high levels of R&D investment and no guarantee of a usable product at the end of it. Requiring us to construct new and complex chains that require high levels of collaboration. And forcing us to expand the boundaries of our knowledge and capabilities.

And then there is the geo-political complexity which has come to characterise our operations in many parts of the world.

Consider, for example, BTC – the Baku Tbilisi Ceyhan pipeline that has opened up a new energy corridor through the former Soviet Union into Turkey. This is a story of a truly modern complex undertaking.

The technical challenge of constructing one of the world's longest pipelines was far from straightforward.

But perhaps the biggest challenge was political - having to align the interests of Azerbaijan, Georgia and Turkey, as well as different communities within those countries, and at the same time responding to the concerns of NGOs and numerous other stakeholders, often pulling in

very different directions. I regard the completion of this project as one of BP's greatest accomplishments in recent years.

What will it take to succeed?

I've talked about the way the industry is changing.

So what will it take to succeed in this complex, high risk environment?

In my view, the energy companies that succeed in the future will need to have a very particular set of attributes:

- They will need to be **flexible** and **responsive** enough to deal with a rapidly evolving environment and seize new opportunities as they arise;
- They will need to be **risk-taking** to deal with multiple levels of uncertainty;
- They will need to be **visionary** so they can understand the wider picture, and embrace the future challenges;
- And they will need to be **integrators** along the energy supply chain, linking up different skills and industries in new and innovative ways.

Underpinning all of these, the key ingredient for success is going to be the ability to *collaborate*.

Collaboration

Collaboration is hardly a new idea. I gather it was a common theme in your plenary sessions yesterday and I have talked about it on a number of previous occasions.

We all know that this is a highly competitive industry, one of the characteristics that have made it so successful in the past. And we will continue to compete strongly to access new resources and supply better

and better products to our customers. Competition drives innovation in our industry and creates better value for our customers. But the scale and nature of the challenges we face going forwards will also require unprecedented levels of collaboration in the future.

And it will need to happen on many different levels and with many different partners. Let me give some examples of what I mean:

Academic collaboration:

At BP our university collaborations, including with MIT, Berkeley and Princeton here in the US, are very important for us.

At MIT we have created the Projects Academy to develop leadership skills in our most senior cadre of project managers; at Berkeley and the University of Illinois we are creating the BP Energy Bioscience Institute to apply the rapidly advancing science of biology to the energy challenge.

And our collaboration with Princeton has been instrumental in the creation of the hydrogen power concept – which we believe will be one of the key energy sources of the future.

These are just a few examples of what we're doing now – and what the future for BP at least looks like: We believe that bringing the best minds and newest ideas together in a truly creative environment will be essential if we are to come up with the right solutions for the world's energy needs.

One of the truly exciting things that is happening right now is the influx of many of the world's most talented young people into the world of energy. I believe this will do more than anything else to change the nature of our business over the next decade. These people want to change the world, and they will not be content to do things in the traditional way.

Industry collaboration:

Of course, in the upstream business, there has always been a high level of inter-company collaboration in our many Joint Ventures. But it will be necessary to take that collaboration much further, and work with a much wider range of people and businesses.

I've already mentioned our hydrogen energy joint venture with Rio Tinto and General Electric, and our partnership with British Sugar and DuPont on biofuels.

At the moment these are the exceptions. In the future, I believe they will be much more the norm. And not just with big established companies either but with entirely new energy players such as agricultural companies and biologists, venture capitalists and young start-up companies who will provide the very diverse range of skills and knowledge we will need to bring our projects to fruition.

Collaboration with contractors & suppliers:

At the same time we will need to see increased levels of collaboration with contractors and suppliers.

At BP we want to move towards fewer, longer term strategic relationships with our contractors and suppliers. In the past, short term contracts have often resulted in difficult working situations and unnecessary confrontation.

We all know this. By building longer term relationships it will be easier to align our interests. And by jointly planning work over long periods, contractors and suppliers will be able to build and retain skills and increase their capacity.

Standardisation

Closer co-operation between companies and suppliers can also help in the area of standardisation.

In the past, we have tended to treat every new project as a one off, and there have been good reasons for this.

But we have found that by using the same basic concepts more than once, we can remove some of the complexity from the operation, as well as cutting down dramatically on design and construction manhours. And by standardising components, we can deliver economies of scale as well as making it easier for operators to move between different locations where the systems and machinery are essentially the same.

At our ACG project in the Caspian Sea, we are using standardisation to deliver six large offshore platforms, pipelines and onshore facilities in a phased development. The cost, scheduling and productivity gains from standardisation have been enormous. The Phase 1 platform delivered first oil six weeks ahead of schedule. Phase 2 was four months ahead of schedule. So the benefits of this approach are very clear to us.

Of course, there will never be a one size fits all approach. What we expect to see is more standardised solutions in specific basins and in particular regions.

Collaboration with government:

Collaborating with governments around the world is also going to be vital. Future activities will be more and more contingent on governmental requirements around energy security and climate. Cooperation between industry participants and government will be critical in creating the right regimes to ensure clean and reliable energy supplies at the right price.

There is also opportunity for collaboration around technology. As an example of this, we are currently working with the United Kingdom

Government and other industry partners to establish the Energy Technologies Institute. This is a very good example of the kind of collaboration that needs to happen more in my view. Public and private sector coming together, pooling their resources, sharing knowledge and expertise to develop new energy technology solutions that can be deployed commercially in the UK and elsewhere. Again, the scale of the challenge is too large for any company to succeed independently.

To conclude - if you look at the challenges we face today as an industry, they are much tougher than any we have faced before. Increasing demand, supply challenges and concerns about energy security and climate change – these factors are transforming the landscape of our business in a way which makes it very different from the industry I joined thirty years ago.

We have had many decades of business as usual.

But we are in a new situation.

The approaches we have taken in the past have achieved an enormous amount, but they will not be sufficient for us in the future. We have to be more flexible. We have to be more open to new ideas. We have to find new ways of working together.

Our industry has an outstanding track record of delivering on the toughest challenges. We will face many more even larger challenges in the future. To succeed in this new environment, we will have to support each other and work together in ways we have never contemplated before. I have no doubt we will make mistakes along the way, but I also have no doubt we will succeed in the long run because the future of our industry depends on it.

I look forward to being with you on this exciting journey. Thank you.