# Advancing the Energy Transition – Possibilities Everywhere

Angela Strank
BP chief scientist and head of technology, downstream

19 June 2019

Good evening everyone, and thank you Sohail, and the leaders of Student Energy, for inviting me here today.

What an amazing and atmospheric venue this is to hold such a prestigious gathering!

It is a beautiful and iconic  place that I know very well.

Many years ago, I was fortunate enough to undertake part of my PhD research here in Paleontology and this feels like coming home And I feel somewhat daunted that my all time hero Charles Darwin is sitting up there watching me.

This place is home to an incredible, 80 million specimens, from the fields of botany, entomology, mineralogy, paleontology and zoology, gathered from across the world over a period of 300 years.

It's an inspiring building - and we live in an age where the energy transition, and meeting the Paris climate goals, are going to require a great deal of inspiration from us all.

We can see this inspiration in many forms already.

– In the policies of forward-thinking governments

– In the work of universities and research institutes around the globe.

- and in the investments in innovation made by businesses.

And we see it too in the inspiring example of individuals, from a 16-year-old Swedish student – to a 93-year-old British naturalist.

Greta Thunberg and Sir David Attenborough, are separated in age by eight decades and multiple generations.

But they are absolutely united in their ambition to inspire a global effort, to confront what Sir David recently described as, "the greatest threat to humanity".

All of us, in this great hall tonight, are part of that ambition.

Since your first conference ten years ago, you have built a remarkable global network involving 40,000 students from 120 countries. An extraordinary achievement.

As a body, you have committed to building the next generation of energy leaders, to accelerate the energy transition.

Inspiration, ambition and leadership are all fundamental to meeting this global challenge.

And I think there is one more requirement – and that is optimism.

And that is the note I wish to strike in my remarks this evening – optimism about the possibilities that are everywhere, for advancing the energy transition. When I started out in the energy industry at the beginning of the 1980s - some 40 years ago - the big fear was about supplies of energy peaking and declining, and effectively, running out.

How would we keep the global economy moving, and how would we meet the needs of a population that went on to grow by two thirds - an additional 3 billion people - in the course of my career?

Well we did it.

Peak Oil - as it was called – never actually happened and our worst fears never materialized. So, why was that?

Well, we did what scientists, technologists, engineers, economists, and a host of other dedicated people do, when faced with a significant challenge.

We innovated, we evolved, transitioned, and we found new ways to discover, produce and supply more energy, to the growing world.

We turned a fear of energy shortage into an age of energy abundance.

Today, we call the challenge facing the energy industry the Dual Challenge – meeting the increasing global demand for energy while lowering greenhouse gas emissions.

If we assume that we continue to evolve as in the recent past – then we can see a scenario where global energy demand grows by around a third by 2040.

That’s nearly the same as adding the energy demand of another China plus another European Union to today’s demand.

But that scenario also indicates that carbon emissions could grow by around 10% - when studies show that they need to fall by half, to be in line with meeting the Paris climate goals.

Some people often think the solution is simple: we just need more renewables.

Well, they're right, up to a point, because renewables are growing faster than any fuel in history – and their costs have fallen significantly in recent years.

This is why, over the last 15 years, BP has built substantial businesses in biofuels, in wind and in solar

But to deliver the energy the world needs, and to lower emissions significantly, every type of energy needs to be cleaner, and more efficient.

Society has to find additional ways of bringing emissions down over the next 20 years – as well as lay the groundwork for the decades that follow.

So Paris is about a race to lower emissions, not just a race to renewables.

It's a race I firmly believe we can all win.

This evening I want to pick out two areas of the energy transition where we can make a real difference.

The first is in power generation and the second is in transportation.

And I'll say just a little this evening about what BP is doing.

The energy supply sector accounts for around 35 percent of all man-made greenhouse gas emissions, with power generation, on its own, accounting for a large share.

Power has much greater potential in the near term, than transport or heat for reducing greenhouse gas emissions, economically and at scale.

38% of the world's electricity is still generated using carbon intensive coal.

So one way to meet the dual challenge is to replace coal in the power sector, and substitute it with renewables and natural gas.

What happens in the power generation space really matters.

It means we can make a huge difference on emissions and we already have the evidence that it works.

In the USA, replacing coal with gas in power generation has helped bring emissions down to where they were in the early 1990s.

In the UK the change is even more dramatic.

Emissions are back where they were when this Museum was first opened - 140 years ago.

Gas has made a big contribution to those reductions because it emits half the carbon of coal, when burned to produce power.

And it's the perfect partner for renewables, which by their nature are intermittent.

That's why at BP we are growing both our natural gas business AND our renewables business – and, at the same time, developing new opportunities to supply our customers with smart, low carbon energy solutions.

There's something else that has huge potential to dramatically change emissions – and that is carbon capture and storage.

Together, with 12 other major oil and gas companies from countries such as Brazil, Mexico, Saudi Arabia, Italy and Spain, we have formed the Oil and Gas Climate Initiative, known as the OGCI.

It's an organisation committed to investing in innovative technology and start-ups, to lower the carbon footprints of the energy and industrial sectors.

BP is working with OGCI to progress the UK's first, commercial, full-chain CCUS project.

This project will capture CO2 from new, efficient, gas-fired power generation, and transport it by pipeline to be stored in a reservoir underneath the North Sea.

This infrastructure will also allow other local industries to store CO2 captured from their processes.

Another big step society can take on emissions is to transform the world's transport system, which accounts for around 15 per cent of greenhouse gas emissions.

That's less than agriculture or manufacturing, but it's one sector where we can make a significant difference.

In fact, we already are.

The number of electric vehicles on the road is growing rapidly, from under a million in 2015 to over 5 million today.

China alone has almost 500 different electric vehicle manufacturers, with annual sales expected to exceed one million vehicles this year.

Electric vehicles are going to make a significant contribution, particularly to improving air quality in urban areas

That's why BP's investing in new technologies and business opportunities presented by electrification.

BP Chargemaster is now the UK's largest electric vehicle charging company, with more than 6,500 public charging points, and over 50,000 customers

We've also installed vehicle charging points in other countries including the USA, China, Germany, France, The Netherlands and New Zealand.

But, there is more to do.

In Israel, we've invested and partnered in an innovative battery company– StoreDot - that has technology to charge a mobile phone in just one minute.

StoreDot is now working on the ambitious aim of charging an electric vehicle in the time it takes to fill a conventional tank with diesel or gasoline.

But if we want to transform emissions from transport, then we have to think about the vehicle fleet that is on the road today – not just the EVs.

Right now, there are around one billion cars on the planet, of which a tiny fraction are electric.

Over the next two decades, the number of all cars is likely to double, to 2 billion, of which around 300 to 400 million will be electric vehicles.

That is a phenomenal change, but it still means more than three-quarters of the global fleet will run on conventional internal combustion engines.

So we need to work on making all vehicles 'lower emission vehicles'.

Energy providers, like BP, are working with motor manufacturers to develop engines, fuels and lubricants that enable vehicles to go further on less fuel, cutting down emissions.

Here in Europe, cars with gasoline and diesel engines could be 50% more efficient by 2040 than they were in 2000.

So at BP, we're developing advanced, lower carbon fuels, and lubricants for these customers.

For example, We've developed a new formulation for our Ultimate range of fuels that protect engines from dirt, improving fuel efficiency and therefore helping to lower emissions.

Similarly, in lubricants, we've developed Castrol MAGNATEC with DUALOCK technology, that delivers 50% reduction in engine wear, thereby improving fuel economy – and, again, helping to lower emissions.

And if we look beyond passenger vehicles, to air and marine travel – it's a similar story.

In aviation, we've invested in a Californian company called Fulcrum Bioenergy, who are developing their first commercial-scale plant to turn household waste or trash into renewable diesel and bio jet fuel – which could reduce greenhouse gas emissions by up to 80%.

If we are going to meet the dual challenge in transport, we need to embrace new powertrains, new fuels to power them, and new technologies to boost efficiency.

But what will it take to accelerate the low carbon energy transition across every sector?

## Speeding up the energy transition – Three Ps.

There are three things that I think are particularly important – and these are what I call the 'the three Ps' - policies, partnerships and people.

## Policies

Firstly, policies that enable a price for carbon to emerge have a critical role to play.

Done well, they can provide the right incentives for everyone – energy producers and consumers alike – to play their part in reducing emissions.

A fifth of the world's GHG emissions are now covered by carbon pricing systems, double the coverage from just five years ago.

Local policies are also playing their part.

For example, California's Low Carbon Fuel Standard, has created a growing market for low carbon fuels.

And in response, our refinery in Washington State has developed the capacity to co-process waste fats and waste oils to produce renewable low carbon fuels

## And the second P stands for Partnerships

The pace of technical innovation is greater than ever before and developments are coming from new and different sources compared to the past - new partnerships, new entrepreneurs, new competitors and new opportunities for our industry.

These new relationships enable us to tap into a wealth of different thinking and experience.

For example, in the US, we have worked for two decades with Princeton University on climate science to accelerate the pace of discovery, and the application of carbon solutions at scale.

New partnerships are why we set up BP Ventures more than ten years ago - to identify and invest in high growth, game-changing technology companies, accelerating innovation across the entire energy spectrum.

Since then, we have invested over $500 million in technology companies across more than 50 entities with more than 300 co-investors.

Along the way, we've met some remarkable companies doing incredibly innovative work.

For example, the manufacture of cement is responsible for more than 5% of all the world's carbon emissions.

It's why we've invested in Solidia Technologies – a young company that has found a way to lock away carbon dioxide in concrete through the curing process – reducing its carbon footprint by up to 70%.

The potential in these partnerships is immense – but it requires great people like you to unlock it.

And this where we all have a part to play.

## And the third P is People

At BP we're committed to advancing a low carbon future.

I'm surrounded by people who want to play their part: engineers, scientists, technicians, economists and specialists in energy policy.

But we all have to do more. We know that on our own, it is never going to be enough.

That's why our people in BP love working with these early stage companies and entrepreneurs, seeing their passion, and finding ways to bring their ideas and technologies into growing successful businesses at speed.

Because at the end of the day, it's people who see opportunities, bring truly disruptive ideas, and who are driven by a desire to change the way the world uses its resources.

Which brings me to where I began my remarks tonight – on the themes of inspiration, leadership and optimism.

More energy with fewer emissions is not far-fetched or futuristic.

We can win this race to a lower carbon future over the next few decades.

It's not dependent on any one big technological breakthrough.

The world already has the know-how, resources and, increasingly, the will to work together to do it.

And there are possibilities everywhere we look.

That's where you all come in.

We need your help and we need your ideas.

We need your ambition and we need your inspiration.

We need you to be the next generation of leaders to help make all forms of energy cleaner and better for the planet.

Energy that will meet the needs of the world with fewer carbon emissions, and in the process, continue to transform the lives of billions of people, bringing them out of poverty, and keeping the world advancing.

That’s quite a calling – and I’m delighted to know that you all want to be a part of it.

Thank you.