Issues Management Working Group
5 June 2017

Pre-read

Agenda Item 1: Context, Agenda, Minutes

Members of the Issues Management Working Group

IMWG agenda and pre-read for 5 June 2017

At the March meeting, we finalised positions on biodiversity, responsible supply chain management and renewable energy. These are available on Messagebank.

At this meeting, we will:

- Agree the revised positions on:
  - Modern slavery
  - Climate change

- Discuss and agree an update of our existing position on carbon offsets.

- Receive an update on net zero emissions.

- Review the IMWG forward agenda.

I look forward to our discussions on 5 June.

Dev Sanyal
22 May 2017

BP p.l.c.
ISSUES MANAGEMENT WORKING GROUP MEETING
Monday 5 June 2017
SJS 4.53 Caspian 2.00-5.00pm, St James's Square London

AGENDA

13.00	1	**Context** • To confirm minutes from the March 2017 meeting and review actions* • To confirm objectives for today's meeting • To highlight key activities in current context	Dev Sanyal
13.10	2	**Modern slavery*** • To approve the draft final position • To review audiences for this position	Eamonn Naughton
13.30	3	**Climate change*** • To approve the draft final position • To review audiences for this position	Paul Jefferiss
14.20	4	**Carbon offsets** *(position review)** • To note current context and changes since position was last agreed • To discuss and agree an updated position • To review audiences for this position	Paul Jefferiss
15.20	5	**Net zero emissions** *(information note)** • To note current context on net zero emissions	Paul Jefferiss
15.50	6	**IMWG process*** • To review the forward agenda	Kathrina Mannion
15.55	7	**AOB and date of next meeting**	Dev Sanyal

* Papers attached

Dial in details are as follows:

UK Freephone Dial-In Number: 0800 694 1555
Conference code: 3824491608

UK Local Call Dial-In Number: 08451462024
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Issues Management Working Group

IMWG Meeting Notes – 29 March 2017
Caspian 4.53
13.00 – 16.00

Attendees: Dev Sanyal (chair), Richard Bridge, Dominic Emery, Richard Harding, Paul Jefferiss, Edlyn Moy, Eamonn Naughton, Jonathan Neal. By phone: Kathrina Mannion, John Mingé, Bob Stout.

Guests Peter Allwinton, Dan Barry, James Primrose, Angela Strank.

Apologies: Emily Carey, Spencer Dale, David Eyton, Peter Henshaw, Andy Hopwood, Peter Mather, Tom Pennington.

Context

- Tom Pennington is IMWG's new upstream representative, replacing Shiva McMahon.
- Investor roadshows took place on the 3 days following the IR strategy presentation on 28 Feb. The Executive Team met with ~35% of BP's shareholders. There were references to the low carbon transition in most of the discussions, with varying levels of interest by region, which illustrates the differing priorities on climate in Europe, UK and US investors.
- OGCI Climate Investments was formed in December. The new CEO will be announced soon. Over 250 proposals have been received since the November 2016 launch event, with around 15 shortlisted for further evaluation. Priorities are on CCUS, methane and energy efficiency.
- The Breakthrough Energy Coalition (led by Bill Gates) has also established an investment vehicle (Breakthrough Energy Ventures) with areas of overlap with OGCI Climate Investments. Potential collaboration opportunities are being explored.
- With IMWG successfully operating and continuously improving over the past 5 – 6 years, it is now timely to look at the next phase of the IMWG process, with a view to simplify and ensure positions are well joined up.

Renewable Energy

IMWG agreed the following changes:

- First key message: change 'low' emissions to 'lower' emissions.
- Second key message: revise end of bullet to '….subject to policy and technology developments and evolving consumer preferences'. Reference EO outlook.
- Fourth key message: delete 'biofuels and wind'.
- Fifth key message: recast bullet to be less defensive and incorporate gas power intermittency back-up point.
- Within "BP and renewables" in additional information:
  - Change 'biomass' to 'bioenergy' in the first bullet.
  - Recast second bullet to be more factual, e.g 'Since 2005, BP has invested an initial $8billion in alternative energies but outcomes have been contingent on the pace of policy, technology and consumer preference evolution'.
    - First sub-bullet – change 'business' to 'businesses' and 'profit making' to 'operating cashflow positive'.
    - Delete the other two sub bullets.
    - Add reference to recent IST biogas investment.
- Within "Outlook for renewables":
  - Add point around evolving consumer demand/desire for renewable energy.
  - 2nd bullet: add reference to technology and customer preferences after 'stronger climate policies'.
- In "Technical perspectives and challenges" alter last sentence in third bullet to "Biomass resource base varies geographically both by type and quality".

Action: Make final amendments, circulate final position to IMWG by email and place it on Messagebank (JP/KM) – by end April

Responsible supply chain management

IMWG members agreed the following changes:

- Ensure all statements are backed up by proof points.
- Consider whether to add 'in some locations' to the fourth key message to be consistent with the additional information bullet.
- In the 3rd bullet under 'BP approach'– change 'have established' to 'are working towards'.
- Under 'Human rights', add reference to UN guiding principles in the second bullet and reword the statement on social

performance audits to reflect that we do this in 'some locations' and are working towards a more consistent approach.
- Reword last bullet under 'Environmental management' to avoid implying we are only concerned with what happens on site.

Action: Make final amendments, circulate final position to IMWG by email and place on Messagebank (DA/PA/KM) – by end April.

Biodiversity

IMWG members agreed the following changes:

- Elaborate on OMS further, i.e. reference continuous improvement if possible.
- Delete reference to the Nature Conservancy and Fauna and Flora International in the last key message
- Remove statements on biodiversity threats to ensure all factual and from credible sources.
- Under 'BP approach'
  - Define 'sensitive areas' (as referenced in the 'Sensitive Areas position) and verify whether the five businesses mentioned fall within the definition.
  - Fourth bullet: consider whether offshore Angola monitoring programme is the best example in terms of uniqueness or if there any others.
  - Fifth bullet: change 'and' to 'to'.
- Under 'Biodiversity offsets', add 'practicably' and at reasonable cost i.e. 'cannot be practicably avoided or restored at reasonable cost'.

Action: Make final amendments, circulate final position to IMWG by email and place on Messagebank (EN/KM) – by end April.

Climate Change

IMWG members made the following comments:

- The position needs to be simplified and clarified.
- The key messages should include the following elements:
  - Recognition of the scale and urgency of the climate change challenge and what this means for our sector. Reducing emissions while meeting growing demand for secure affordable energy.
  - Other sectors have a key role to play, in particular agriculture, forestry and land use.

  - Consumer choices are key. Size and type of demand is as important as production.
  - To keep the costs of the energy transition as low as possible, policy should strengthen gradually and predictably.
  - Our strong preference is for carbon pricing over regulation. We are neutral between cap and trade and taxation, as long as the tax is well constructed and does not increase the overall tax burden. In practice, however, cap and trade systems can sometimes provide greater flexibility than a standard carbon tax system.
  - BP is providing solutions. We have a strong action plan. List the key actions.
  - Reference Paris but don't over-emphasise.

- In additional information:
  - Subdivide the additional information with more headings to guide the reader.
  - Refer to EO base case as "most likely", not likely.
  - Nuclear should be included.
  - Remove jargon from the sub-bullets on strategy or preferably cut altogether.
  - Pursuing efficient operations sub-bullet: clarify what is meant by 'relevant' businesses.
  - Helping customers sub-bullet: reword the 'design of fuels and lubricants'.
  - Reword the bullet on stranded assets to be clearer.
  - Cut reference to Imperial College.
  - Explain preference for trading. Define flexible taxation clearly.
  - Retain need for revenue neutrality.

Action: Revise position to reflect IMWG feedback. Include the 18 other IMWG positions that relate to climate change in the next IMWG pre-read as an appendix. Position to be discussed again at next meeting (PJ/KM) – by mid May.

Modern Slavery

IMWG members made the following points:

- Overall check proof points are statements of fact rather than aspirations.
- Within the key messages:

  - Third bullet: change 'structured' to 'systematic'.
  - Fourth bullet: make reference to this being a multi-year effort
  - Fifth bullet: delete 'a number of' and 'for example….'.
- Under 'Modern slavery' in additional information, review and reduce 2nd to 6th bullets.
- Under 'BP approach' delete final bullet.

Action: Revise position to reflect IMWG feedback. Position to be discussed again at next meeting (DA/EN/KM) – by mid May

IMWG process

The June agenda was agreed and will cover a revision of our carbon offsets and CCUS positions and an information note on net zero emissions. The note on net positive approach should be deferred to the December meeting, alongside the item on 'BP's contribution to society'.

AOB

The next IMWG meeting is 5 June 2017.

IMWG Action Log: Updated 22 May 2017							
	Action	**Lead**	**Issue**	**Complete by**	**Status**	**Notes**	**IMWG Meeting**
190	Make final amendments, circulate final position to IMWG by email and place it on Messagebank	JP/KM	Renewables	end April 2017	**Complete**		29/03/2017
191	Make final amendments, circulate final position to IMWG by email and place on Messagebank	DA/PA/KM	Responsible supply chain management	end April 2017	**Complete**		29/03/2017
192	Make final amendments, circulate final position to IMWG by email and place on Messagebank	EN/KM	Biodiversity	end April 2017	**Complete**		29/03/2017
193	Revise position to reflect IMWG feedback. Include the 18 other IMWG positions that relate to climate change in the next IMWG pre-read as an appendix. Position to be discussed again at next meeting	PJ	Climate change	mid May 2017	**Complete**	On June agenda	29/03/2017
194	Revise position to reflect IMWG feedback. Position to be discussed again at next meeting	DA/EN/KM	Modern Slavery	mid May 2017	**Complete**	On June agenda	29/03/2017

Agenda Item 2: Modern slavery

Members of the Issues Management Working Group

Modern slavery

The modern slavery position has been revised to reflect the discussion at the March IMWG meeting and to incorporate the comments provided.

Communicating the position

The external audiences for this position are:

- Relevant governments, investors and NGOs as appropriate.

The internal staff that need to be aware of this position are:

- C&EA and GPA teams.
- Heads of HSE Group and Segments
- Ethics & Compliance (Group and regional colleagues involved in Upstream risk review)
- Procurement Supply Chain Management (PSCM)
- Legal
- Regional Presidents and Heads of Country

The purpose of this IMWG item is to review and approve the position.

Eamonn Naughton
22 May 2017

Modern slavery

Key messages

- BP **supports the elimination of all forms of modern slavery**, including human trafficking and forced labour.
- We are committed through our code of conduct and human rights policy to **conduct our business in a manner that respects the human rights** of our employees, agency and contractor staff and suppliers' employees.
- We are undertaking a **systematic review of the risk** of modern slavery in our businesses and supply chains.
- We will work over the long term to **strengthen our ability** to identify and manage modern slavery risks through existing processes. This includes closer scrutiny of suppliers and contractors before we award contracts, and the inclusion of more specific labour rights clauses in our standard procurement contracts.
- We are progressing on our planned work with contractors to help make sure the labour rights of their workforce are respected.
- BP's first annual slavery and human trafficking statement will be published on our UK website in mid-2017, in compliance with the UK Modern Slavery Act.

Related briefs: Human rights, Responsible supply chain management

Additional information

Modern slavery

- Modern slavery encompasses a range of exploitative practices, including forced or compulsory labour, human trafficking and servitude, which are contrary to international human rights standards.
- The International Labour Organisation's 2012 estimate indicates some 21 million victims of forced labour are working in many industries, in developed and developing countries.
- Modern slavery is difficult to eliminate, due to weak enforcement of labour standards by governments, corruption and the challenges companies face in identifying and managing the risk through their supply chains.

BP approach

- We are committed to continue improving our understanding and management of modern slavery risks now and over the long-term.
- We are assessing the risk of modern slavery in our business and supply chain by taking into account:
  - Countries identified by independent assessments as posing a high degree of risk.
  - Activities reliant on manual labour, such as cleaning, catering and construction, and factors related to workforce vulnerability, such as the presence of migrant workers, poverty levels and recruitment through labour brokers.

- Our work on modern slavery is part of our broader effort to further align our processes with the UN Guiding Principles on Business and Human Rights, which articulate companies' responsibility to respect human rights (including labour rights).
- Many of our policies and practices – e.g. those relating to employee relations, health and safety, the assessment and management of environmental and social impacts – help us manage our activities' potential human rights impacts, including labour rights.
- We have focussed on human rights awareness for some years and annually train hundreds of people in our organisation. We are now expanding our training, to focus on identifying indicators of modern slavery, appropriate mitigations and controls.

Managing the risk in BP's supply chain

- Management of modern slavery risks is ultimately the responsibility of each company or employer in a supply chain. We expect our suppliers and contractors to respect the rights and dignity of their workers and not to engage in practices that would amount to modern slavery.
- Consistent with our human rights policy, we encourage improvements in the labour rights performance of our contractors and suppliers, including through direct engagement with them individually and in forums, to manage the risk of modern slavery.
- We are taking steps to enhance our ability to assess and address modern slavery risks in our supply chains, including by:
  - Incorporating labour rights clauses into standard procurement contracts.
  - Conducting enhanced due diligence before we award contracts and assurance after we award them, focusing on those contracts where we believe the risk to be higher.
  - Our Upstream projects organization has introduced guidance on how to effectively apply BP practices to respect the rights of the contracted workforce.

Disclosure requirements

- A number of BP companies are in scope of the UK Modern Slavery Act's requirement to report steps taken to ensure that modern slavery is not taking place in their own business or any of their supply chains.
- Our slavery and human trafficking statement will also meet the disclosure requirements of California's Transparency in Supply Chains Act, under which we already report.
- We report annually to our stakeholders on our progress in meeting our human rights policy commitments, including on labour rights, through our Sustainability Report.

Contact Liz Rogers / Dominic Emery

Agenda Item 3: Climate change

Members of the Issues Management Working Group

Climate change

The climate change position has been revised to reflect the discussion at the March 2017 IMWG meeting and to incorporate the comments provided.

As requested in March, the 18 IMWG positions relating to climate change are also attached as an appendix to the pre-read for information. These are not up for review, though they will be updated to be consistent with the revised climate change position, once it's agreed.

Communication

The external audiences for this position are:

- Relevant regulators and policymakers
- SRIs
- Other external stakeholders e.g. NGOs
- Peer associations and organisations e.g. IPIECA, IOGP, OGCI

The suggested internal staff that need to be aware of this position are:

- C&EA and GPA staff
- Central S&OR
- Group communications
- Group economics
- Regional presidents and heads of country

The purpose of this IMWG session is to review and agree a position.

Paul Jefferiss
22 May 2017

Climate change

Key messages

- BP recognises the **scale and urgency of the climate change challenge**. For our sector, this means lowering GHG emissions while supplying the energy the world needs securely and affordably.
- Working with others, BP is actively **seeking and providing solutions**. We are calling for a price on carbon; supplying natural gas and managing methane; providing renewable energy; pursuing energy efficiency, investing in technology start-ups and innovation, and helping our customers reduce emissions.
- **All sectors have a critical role to play**. Agriculture, forestry and land use emit about a quarter of global GHGs. Restoring soils and slowing deforestation could dramatically reduce CO_2 and help protect biodiversity.
- **Consumer choices are key**. Consumers account for 80-90% of CO_2 emissions from oil and gas products.
- Government policy is needed to ensure a stable, orderly transition to lower carbon. Our strong preference is for economy-wide **carbon pricing** over regulation.

Additional information

The Paris Agreement

- We welcome the Paris Agreement, which aims to hold temperature rise to well below 2°C and pursue efforts to limit it to 1.5°C. To achieve this, Parties agreed to aim for net zero emissions during the second half of the century.
- Achieving these aims will require action from governments, consumers and business. Current nationally determined contributions (NDCs) fall short of the Paris aims.
- Complexities and barriers make achieving the Paris aims very challenging:
  - Countries are at uneven stages of development, with different resources.
  - Many sectors have a key role to play: energy; agriculture; forestry; cement
  - Energy demand is growing – access to affordable and secure energy is essential.
  - Fossil fuels are not the same – used for power, gas emits half the CO_2 of coal.
  - Consumers account for more than 80% of fossil fuel emissions.
  - Lower energy demand and lower carbon intensity will both be needed.
  - A diverse mix of fuels and technologies is needed: energy efficiency; natural gas; renewables; electrification; CCUS; nuclear.
  - Negative emissions options (bioenergy CCS and enhanced sinks) are necessary.

BP Energy Outlook emissions projections

- We project that global CO_2 emissions from fossil fuels may be 13% higher in 2035 than in 2015. This is not what BP wants to see, but what we currently think is most likely.
- Further action will be needed to transform the energy system and other sectors. Our 'faster transition' scenario has carbon prices in leading economies rising to $100/tonne by 2035 and policy interventions that encourage more rapid efficiency gains and fuel switching. This could lead to a 12% decrease in CO_2 from energy by 2035.
- Our 'even faster transition' scenario matches the IEA's '450 scenario', which aims to

limit the global temperature rise to 2°C. In our scenario, energy CO_2 could fall by around 32% by 2035 from 2015 levels, with oil and gas still comprising 48% of primary energy.

BP approach

- Carbon price: We put a price of $40/tonne of CO_2 equivalent on emissions from our own large new projects in industrialised countries. We stress test at $80/tonne.
- Supplying natural gas: We are increasing gas in our portfolio and ramping up action to reduce methane emissions.
- Providing renewables: BP has the largest operated renewables business among our peers. We will grow and add to these businesses.
- Supporting innovation: Technological innovation underpins our efforts to make operations and products more efficient and lower carbon.
- Pursuing efficient operations: Internally we focus on energy efficiency, including flaring reduction, and have targets set by some businesses.
- Helping customers reduce emissions: We develop efficient fuels and lubricants.
- Adapting to climate impacts: We seek to address the potential impacts of climate change on our new projects from the design phase.
- Collaboration: BP works with for example: Oil and Gas Climate Initiative; Princeton's Carbon Mitigation Initiative; World Bank Zero Routine Flaring by 2030 Initiative; Climate and Clean Air Coalition; Carbon Pricing Leadership Coalition; supporting country's NDCs.

BP resilience through the transition

- Our strategy is to remain competitive and sustainable when prices, policies, technologies and consumer and shareholder preferences are changing. A balanced portfolio and dynamic investment strategy make us more resilient:
  - A shift towards producing more gas and lower cost oil resources.
  - Selling new gas, oil and petrochemical products into new and growing markets.
  - Growing our biofuels and wind businesses, and exploring commercial low carbon opportunities in power, transport, bioenergy, CCUS and carbon trading.
  - Making the whole company more efficient, including by using digital technology.
- We don't expect our proved resources to be stranded because on average they are produced over 14 years, giving us the flexibility to respond to quickly.

Climate policy and carbon pricing

- To keep the costs of the energy transition as low as possible, policy should strengthen gradually and predictably.
- Carbon pricing is the most comprehensive and efficient policy to limit GHG emissions and should be implemented with the widest coverage and greatest flexibility possible.
- Cap and trade and taxation can be equally effective, provided each is designed to give flexibility to pay the price, abate yourself or receive credit for abating elsewhere, and does not increase the effective tax burden.
- Until approximate global carbon pricing equivalence exists, governments should limit "carbon leakage" by ensuring trade-exposed domestic sectors are not disadvantaged.
- We believe renewables and CCUS should ultimately compete with only a carbon price. Until then, transitional incentives are needed, but these should:
  - Be targeted at technologies with proven potential for cost and GHG reduction.
  - Be provided only until competitiveness is achieved or shown to be unachievable.
  - Not duplicate or overlap with carbon pricing systems.

Contact Paul Jefferiss

Agenda Item 4: Carbon offsets

Members of the Issues Management Working Group

Carbon offsets

IMWG agreed a position on carbon offsets in 2013. Since then, there have been some significant external policy developments and substantially increased BP participation in carbon offsets that warrant revisiting that position. A review also offers the opportunity to consolidate and improve our key messages.

Communication

The external audiences for this position are:

- Relevant regulators and policymakers
- SRIs
- Other external stakeholders e.g. NGOs
- Peer associations and organisations e.g. IPIECA, IOGP, OGCI

The suggested internal staff that need to be aware of this position are:

- IST
- BPTN
- C&EA and GPA staff
- Central S&OR
- Group Communications
- Group Technology

The purpose of this IMWG session is to review and agree the revised position.

Paul Jefferiss
22 May 2017

Carbon offsets

Key messages

- BP supports **carbon offsets** as an **effective and low cost** way for society to reduce global greenhouse gas (GHG) emissions. It is often less expensive and disruptive to reduce emissions in non-energy sectors such as agriculture, forestry and other land use (AFOLU).
- We strongly support the inclusion of carbon offsets in any **regulatory compliance scheme** for GHG emissions reductions from energy use.
- We support the development of an **international market mechanism** under the **Paris Agreement** to enable investment in carbon offsets through both financing and active trading by the private sector.
- **Voluntary** use of offsets is **an individual choice**, for consumers and for companies. They should be used alongside efforts to reduce energy use and replace high emissions sources.
- **BP Target Neutral** has helped BP's customers and customer facing businesses to voluntarily offset 2.5 million tonnes of their own carbon emissions. BP offsets its emissions voluntarily only where there is clear customer demand to do so.
- To guarantee emissions reductions, offsets should always be of **high quality** – real, additional, verifiable, permanent and effective.

Related briefs: Carbon pricing, Climate change

Additional information

What is a carbon offset?

- At its simplest, a carbon offset is a reduction in greenhouse gas (GHG) emissions made to compensate for or offset GHG emissions elsewhere.
- Offsets are currently traded internationally under the Kyoto Protocol. A country can invest in an offset in another country that then counts towards their domestic GHG target.
- This could change under the new UN Paris agreement, with details still to be agreed. BP favours a mechanism that maximises flexibility and private sector participation.
- There are several countries (e.g. China, US states, including California, Canada, New Zealand) where offsetting is used as a domestic regulatory instrument that allows companies to comply with emissions reduction policies.
- In addition to use for compliance, a voluntary carbon offset market has developed where individuals or companies choose to buy offsets for their own carbon footprint.

BP's use of offsets

- Compliance:
  - BP advocates the use of domestic and international offsets for compliance with GHG reduction regulations.
  - Offsets give flexibility for industry to achieve reductions at lower cost, and provide

funding to cut emissions from sectors like AFOLU which are not directly regulated.
  - BP uses offsets as a low cost means of compliance where they are permitted.
- Trading and entrepreneurial opportunities:
  - BP IST is one of the major global players in the compliance market and financed over 20 million tonnes of carbon offsets in 2016. Some are used for compliance in our own operations across the world, and the remainder traded in global markets.
  - IST is planning a major investment under the Green Climate Fund in carbon credits from a number of forestry projects in developing countries such as Indonesia and Kenya, with the expectation that these carbon credits will become eligible as compliance offsets in future.
- Voluntary offsets: BP Target Neutral (BPTN):
  - BP does not currently voluntarily offset our own core business activities. We focus on improving energy efficiency and reducing flaring and venting at our own operational sites.
  - BPTN provides offsetting opportunities for our customers to voluntarily reduce their emissions and has become one of the major global players in voluntary offsets.
  - BPTN is increasingly providing offsetting opportunities for our own products and businesses where there is clear customer-led demand for low carbon products.
  - For example, our range of Castrol Professional lubricants are certified as CO_2 neutral via the programme. Also, Air BP has achieved carbon neutrality for into-plane fuelling services across our network of more than 200 operated facilities.

Forestry offsets

- To achieve the aims of the Paris agreement, it will be necessary to substantially reduce GHG emissions from all sectors, including agriculture, forestry and other land use (AFOLU) – in addition to energy. By 2030, mitigation from AFOLU alone could be 11 billion tonnes of CO_2e at a carbon price of $100/te or less.
- Forestry plays a very important role. If global deforestation is not slowed and ultimately halted, additional emission reductions will be needed elsewhere.
- Offsets from forestry can create demand for emission reductions in the forestry sector. This can bring in private sector finance to protect and enhance existing standing forest and establish new forests, with additional biodiversity and community benefits.
- In anticipation of an expanding market for forestry offsets, BP is exploring a number of commercial opportunities to increase our participation in the forestry offsets value chain.

High quality carbon offsets

- We advocate that all offsets should be:
  - Real: they should represent GHG reductions in tons of carbon dioxide equivalent (CO_2e), and it must be possible to reliably estimate how much CO_2e was mitigated.
  - Additional: the reduction or capture of emissions should be incremental to what would have happened without the offset project or action in question.
  - Verifiable: a qualified, independent third party (or appropriate government agency) should confirm that the emissions were reduced or captured.
  - Permanent: any reversal of emission reductions should be accounted for and compensated.
  - Effective: the carbon offset, to the extent practically feasible, should be grounded in broad environmental integrity (e.g. it should not damage biodiversity).

Contact Paul Jefferiss / Dan Barry / Andrea Abrahams

Members of the Issues Management Working Group

Carbon offsets

What is the issue?

IMWG agreed a position on carbon offsets in 2013. Since then, there have been some significant external policy developments and substantially increased BP participation in carbon offsets that warrant revisiting that position. In particular, there may now be justification for stronger advocacy for the use of offsets as compliance instruments in carbon regulation, and reason for considering expanded use of voluntary offsets, subject to clear guidelines. A review also offers the opportunity to consolidate and improve our key messages.

What is a carbon offset?

At its simplest, a carbon offset is a reduction in greenhouse gas (GHG) emissions made to compensate for or offset GHG emissions elsewhere. Carbon offsetting came to prominence via the "Clean Development Mechanism" (CDM) under the UN Kyoto Protocol in the 1990s. The CDM allows emission-reduction projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tonne of CO_2. These CERs can be traded and sold, and used by industrialized countries to meet a part of their emission targets under the Kyoto Protocol (i.e. they are used as an offset). The mechanism stimulates sustainable development and emission reductions, while giving industrialized countries some flexibility in how they meet their emission targets. Some domestic emissions trading systems (ETSs) such as the EU's and Korea's allow companies to use CERs as a possible compliance option.

Carbon offsets are now used more widely. Apart from the UN process, there are several sub-national, national and multilateral offset markets operating or under development (e.g. Australia, California, Canada, China, New Zealand). In China and New Zealand for example, their domestic emission trading systems accept the use of domestic offsets as defined by their domestic programs. The California cap and trade system also allows offsets from within the state, other US states and is considering allowing certain international offsets. In these cases, offsetting is used in country as a regulatory instrument for reducing emissions. Offsets can be used by companies, including BP, as means

of compliance with emission reduction policies. However, the level of offsets is usually capped to ensure domestic GHG emissions reduction efforts continue.

BP current position and internal policy on the use of carbon offsets

At the highest level, BP has supported offsetting because it enables emission reductions at lower cost, and creates the incentive for emission reductions in regions or sectors without incentives of their own. International offsetting can also help start the process of reducing the carbon intensity of energy in poorer parts of the world. Offsets can also offer a low costs means of compliance in countries where offsetting is permitted. However, our current position also recognises carbon offsets can be of variable type and quality, face technical challenges and bring risk.

Our position has therefore been to support high quality carbon offsets as one option for compliance. We ourselves use regulatory offsets for compliance where permitted and where it makes business sense.

We also participate in the voluntary offsets market through our BP Target Neutral (BPTN) business. BPTN uses carbon offsets to provide carbon neutral opportunities for our customers, our own products and to some of our businesses and a limited number of activities. BP does not currently use voluntary offsets for our core business operations.

Carbon offsets post-Paris

Up to now, the CDM has been the major source of international offsets, but things will change under the Paris Agreement. The Paris Agreement does not mention the CDM or carbon offsetting, but Article 6 lays out the foundation for a new "offset-like" mechanism that could help countries reduce their emissions and promote sustainable development. All of the details on how this new mechanism will function have yet to be agreed.

Stakeholders, including the countries themselves, have conflicting views on the implementation of this offsetting mechanism. Some argue for a quasi-continuation of the current CDM set up. Others argue that it should be restricted to certain sustainable development projects in the least developed countries. Others again argue for a mechanism that avoids some of the limitations of the CDM and provides an incentive for a wider participation of the private sector and the mobilization of private

sector finance.

For BP and society, we would argue that the flexibility to reduce emissions from across as many sectors of the global economy as possible will result in meeting the Paris objectives at the lowest possible cost. We would also argue for maximum flexibility of implementation, including the ability of the private sector to finance and trade in whatever offsetting units are finally agreed.

Demand for offsets:
In theory, there is the potential for offsets to play a huge role in offsetting the need for emissions reductions from the use of energy, and at substantially lower cost.

In practice, actual future demand for offsets depends on a range of political, societal and economic factors. On the one hand, there is potential for growth in demand internationally and in some domestic markets as outlined below. On the other hand, the size of the offset market remains small and many policies and regulations continue to restrict their use. Appendix A provides details on the size of the current compliance and voluntary offsets markets.

(i) International offsets under the UN post-Paris

The Paris agreement is very different from the Kyoto Protocol, in that all countries, developed and developing, have some form of climate commitment under their Nationally Determined Contribution (NDC). While the details of the Article 6 mechanism are yet to be determined, the "no doubling counting" principle established under the Kyoto Protocol remains clear. An emission reduction may only be used once by one Party to demonstrate compliance with its declared NDC. If an emission reduction is transferred from one country (the 'selling' country) to another (the 'buying' country) to be used to comply with its NDC, then the selling country is not 'allowed' to claim the reduction for themselves.

Because all countries now have some form of target or commitment (and not just industrialised nations), this could limit the number of "selling" countries that choose to participate in this proposed offsetting or exchange mechanism, as they cannot also claim credit for an emission reduction in their own country if they've already chosen to allow another country to use it as an offset. The demand for such

credits in the future will be dependent on a range of currently unknown factors such as future scope and ambition of NDCs, countries' needs for finance from others etc. Use of the proposed new mechanism under Article 6 will also be entirely voluntary.

(ii) EU Emissions Trading Scheme (ETS)

To date, in practice, the EU ETS has created the bulk of the demand for international offsets from the CDM. However, this demand has dissipated over time as the EU imposed ever-tighter restrictions on both the type and quantity of offsets that can be used for compliance in the EU ETS. Current demand is almost non-existent with currently little sign it will increase before or after 2020. The EU's GHG reduction target of 40% by 2030 is to be achieved using domestic emissions reductions and so there are no plans for the use of international offsets up to 2030. However, the EU are supportive of the Article 6 mechanism and have stated that they might consider increasing their target beyond 40% and allowing for the use of international offsets - if enough other countries agree to increase their level of ambition before the Paris Agreement starts in 2020.

Any proposal for BP to advocate that the EU should allow the use of international offsets within the EU ETS during Phase 4 (2021 to 2030) would require a thorough business impact analysis of the potential trade-off of a more ambitious target in exchange for use of international offsets for compliance within the EU ETS.

(iii) China

If the Chinese national ETS is implemented as announced, the Chinese national ETS would become the largest carbon pricing initiative in the world, surpassing the EU ETS. Domestic offsets have been included as a flexibility compliance mechanism in the seven ETS pilots.

(iv) Aviation

The International Civil Aviation Organization's (ICAO) new Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) establishes a new source of demand for emission units, which might include CERs under the current UN CDM mechanism. Airlines might, however, be allowed to buy emission units before the start of the CORSIA (2021) and bank them for later compliance. The eligibility of emission units might be restricted to specific vintages and to the initial phases of the CORSIA.

(v) California (and linked North American states/provinces)

California Air Resources Board offsets are used for compliance in the California Cap-and-Trade Program. California is considering links with other subnational schemes such as Quebec and the state of Acre in Brazil.

(vi) Other

Some national carbon pricing initiatives provide the possibility of increased demand for offsets, such as in Korea, Mexico and South Africa. Only domestic offsets are accepted in these initiatives.

Sources of offsets

The type of carbon offset can vary greatly and offsetting projects can include any reduction that occurs outside the regulated jurisdiction or sector, in this case energy use. This can include everything from implementing low carbon agricultural practices, reforestation, reduction in refrigerant loss, or preventing detrimental changes in land use. Even CCS and the use of renewables can be defined as offsets if it can be demonstrated that they would not otherwise have occurred. The current IMWG position on carbon offsets is agnostic on the source of the offset as long as they satisfy the quality criteria specified in the position:

- Real: they should represent GHG reductions in tons of carbon dioxide equivalent (CO_2e), and it must be possible to reliably estimate how much CO_2e was mitigated.
- Additional: the reduction or capture of emissions should be incremental to what would have happened without the offset project or action in question.
- Verifiable: a qualified, independent third party (or appropriate government agency) should confirm that the emissions were reduced or captured.
- Permanent: any reversal of emission reductions should be accounted for and compensated.
- Effective: the carbon offset, to the extent practically feasible, should be grounded in broad environmental integrity.

<u>Forestry offsets</u>

Recent internal analysis has recognised the particular potential importance of agriculture, forestry and land use (AFOLU), initially for offsetting and ultimately in achieving the temperature goals of the Paris Agreement. By 2030, mitigation from agriculture, forestry and land use

alone could be 11 billion tonnes of CO_2e at a carbon price of $100/te or less – that's equivalent to around a third of global GHG emissions from energy. AFOLU offsets are one of the very few available negative emission options that would be required to achieve net zero emissions. Forestry in particular can play a vital role. Slowing, halting, and ultimately reversing global deforestation before the end of the century is an important element of most modelled low emission pathways. If this mitigation fails to happen, or happens at a slower rate or to a lesser extent, then additional mitigation will be required from other sources, including from oil and gas use, and may make the achievement of net zero actually impossible.

At the same time, allowing offsets from AFOLU can provide a means for promoting emissions reductions in forestry, including through the application of a carbon price and the allocation of funding to a sector that would not otherwise benefit from them. Forest carbon offsets provide a source of private sector finance to help protect and enhance existing standing forest and to establish new forests. However, much more effort is needed to realise their potential. Governments have been investigating international mechanisms such as REDD+[1] for well over a decade with little sign of success, and high carbon stock tropical forests continue to be lost.

Greater use of forest carbon offsets could provide multiple sources of value to BP:

- Potential lower cost of compliance for our facilities subject to carbon regulation, particularly in the short term.
- Commercial opportunity in the forest carbon offset and trading value chain.
- Offsets are an effective mechanism to achieve GHG emissions mitigation from forestry, providing more space in a limited carbon budget for CO_2 emissions from the use of oil and gas.
- Potential to support license to operate in fragile ecosystems in countries where we operate.

Given these factors, we may wish to strengthen our advocacy for the compliance use of offsets in general, AFOLU offsets in particular and

[1] Short-hand for "Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries" – an element of the UN climate negotiations.

especially forestry offsets.

BP participation in carbon offsets

Compliance market/IST

BP IST is now one of the major global players in the compliance market with financing of over 20 million tonnes of carbon offsets during 2016. Some of these are used for compliance in our own operations covered by cap and trade systems across the world, and the remainder traded in global markets. The main market for international offsets previously has been the EU ETS, but this market is now very small. There are significant markets for domestic offsets in a number of jurisdictions including California, New Zealand and China. This activity creates value by minimising compliance cost of our obligated facilities, supplying offsets to third party customers and also providing a return for IST through entrepreneurial trading.

IST is planning a major investment in carbon credits from a number of forestry projects in developing countries (Indonesia, Suriname and Kenya) with the expectation that these carbon credits will become eligible as compliance offsets in future post-Paris mechanisms. The downside risk if markets for compliance offsets do not grow is to be underwritten by the Green Climate Fund (GCF). BP's investment (plus notional return) would be reimbursed after 5 years if a return cannot be achieved due to lack of eligibility under compliance markets or low prices. The upside is that these credits become eligible as international offsets, i.e. the ability to trade the credits/offsets into the market and make a real return. The proposed deal also provides BP with an option to secure more credits at the same price.

While the GCF will underwrite the downside risk anyway, there is an opportunity for BP to actively advocate to improve the probability that the compliance market does develop such that IST can make a larger return on its investment. There are two main aspects:

- Supply side - ensure than carbon credits from project based avoided deforestation activities qualify for the new crediting mechanism envisioned under Article 6 of the Paris Agreement.
- Demand side -
    - Post 2020, national and regional cap and trade schemes accept international offsets, including avoided deforestation offsets as an alternative compliance option.
    - The offset mechanism agreed in 2016 by the International

Civil Aviation Organisation accepts avoided deforestation offsets.

Voluntary market/BP Target Neutral (BPTN)

Since the current position was agreed in 2013, BPTN has more than quadrupled activity in the voluntary market and is recognised as a major corporate buyer. BPTN's activity is driven by business or customer demand to reduce their carbon emissions and has three main components:

1. The use of offsets by BP businesses where business customer demand for premium lower carbon products justifies offsetting some proportion of the BP activity (e.g. PTAir, Castrol carbon neutral products, etc.).
2. Helping others offset their emissions as part of a wider programme, including reduction of energy use and replacement of high with lower carbon resources (e.g. FedEx, BP fuel card with offsetting option).
3. The smallest component is a selective use of offsets for BP operations that are analogous to customer activities – for example the road tanker fleet and Air BP ground operations. Air BP has achieved carbon neutrality for into-plane fuelling services across our network of more than 200 operated facilities.

Internal work is underway to determine whether our offsetting marketing offer could be expanded strategically, for example to be included in "bundled offers" to governments to help meet their NDCs.

BP's own use of voluntary offsets

Consistent with our existing position, BP does not currently use voluntary offsets to offset the GHG emissions from our own core operations. Some other large companies such as M&S and Microsoft are now doing this on a large scale and internal work is underway at BP to assess whether this aspect of our position should be reviewed as part of a wider carbon management strategy. This is because voluntary use of offsets on a larger scale offer potentially significant opportunity, for example:

- Can create as much value to society as investing in our own emission abatement projects (one tonne reduced is one tonne reduced, no matter where it occurs)
- Are low cost, immediately available (no delays due to technology or cost barriers such as CCS) and supported by internationally

recognised institutions
- Arguably confer licence to operate in fragile ecosystems, by helping to support forest, community and biodiversity conservation.

There are also risks to this approach. Voluntary offsets:
- Do not remove the expectation that companies continue to directly reduce emissions in their own operations and products – offsets are not a 'get out' clause.
- Will not reduce compliance obligations or reported emissions
- Could create precedent and expectation for more – or become an open-ended commitment
- Could open BP to charges of greenwash if not supported by a robust carbon reduction programme

For now, we propose to keep our position on this aspect unchanged. This may need updating following internal review, particularly if we further expand our market-led use and provision of voluntary offsets.

Conclusions and recommendations

Overall, our broad position remains unchanged. However, slight modifications and additions are proposed in the following areas:
- A tightening and improvement of our messaging to be more suitable for external audiences.
- Stronger proactive support for use of offsets as compliance instruments to maximise flexibility in both cap and trade and carbon tax regimes.
- Focused support for a business friendly implementation of Article 6 of the Paris Agreement.
- An increased focus on the benefits of forestry offsets.
- More information on IST activities including highlighting BP's involvement and support for the GCF project.

The IMWG is asked to review the proposed 2 page position.

Mike McMahon & Kathrina Mannion
22 May 2017

Appendix A: Carbon offset markets

Market	Issuance in 2016 (Mt)	Value (US million)
CERs	126	39
California/Quebec	18	204
Alberta*	6	88
Australia (ACCUs)	13	115
China pilots (CCERs)	23	36.5
Compliance total	**186**	**476.5**
Voluntary**	42	139

*part derived from analysis of 2015 data.
**represents 2015 issuance, 2016 numbers not yet available.

Internal analysis based on:
Compliance market- CARBON MARKET MONITOR 2016, Thompson Reuters, ICIS Tschach analytics, Carbon Pulse, ICE, California air resources board, Alberta climate change office, UNFCCC

The main players in the compliance markets are industrials and power producers. The main voluntary offsets buyers are corporates, from a range of sectors.

Agenda Item 5: Net zero emissions

Members of the Issues Management Working Group

Net zero emissions

An information note on 'net zero emissions' has been prepared to outline the context surrounding the concept, its interpretations and its implications.

The purpose of this IMWG session is to note this information.

Paul Jefferiss
22 May 2017

Members of the Issues Management Working Group

Net zero and the Paris agreement: information note

Context

The Paris Agreement (Article 2) establishes a long-term goal to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.

In order to achieve this long-term temperature goal, Article 4 states that the aim is to reach global peaking of greenhouse gas emissions as soon as possible, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century.

The phrase "a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases" is often referred to as "net zero (GHG) emissions", although this specific 'net zero' wording does not show up anywhere in the Paris text.

It is unclear precisely what is meant by this "balance" phrase. It was coined in the final days of the negotiations of the Paris Agreement to replace other phrases such as "net zero emissions" or "climate neutral" that were unacceptable to one or more Parties. It is a compromise formulation that is poorly defined and open to interpretation, some argue deliberately so, and is likely to result in discussion and debate for years to come. It is unlikely in the near future that the Parties to the Paris Agreement will seek to renegotiate the text or to seek to define it more precisely.

Understanding the 'balance' text

In many ways, the exact interpretation of the text does not matter that much in itself – the aim of Article 4 is not to replace the long term temperature goal of Article 2, but to translate it into what this **might mean** in terms of GHG emission reductions. Article 2 recognises that the science is uncertain and it's therefore not feasible to exactly quantify what level of emissions are allowable for a given temperature goal – this is expected to change as understanding of the science develops.

Nonetheless, the term "net zero" when used in the context of "net zero CO_2 emissions" and "net zero GHG emissions" has been in common usage among the climate modelling community since well before the Paris Agreement. These terms are defined in the next section.

In understanding these terms and their interpretations, it's important to understand the difference between anthropogenic (man-made) and natural "sinks". Examples of anthropogenic sinks include afforestation, reforestation, and bioenergy with carbon capture and storage (BECCS). Natural sinks include the oceans and standing forests. A full list is given in Appendix A.

Possible interpretations of net zero

Two alternative definitions of net zero existed before the Paris Agreement:

1. **Net zero anthropogenic GHG emissions** - when anthropogenic emissions of all **GHGs**[1] equal the anthropogenic sinks of CO_2. Currently there are no man-made sinks of non-CO_2 GHGs (e.g. methane) and none are expected to be developed. Achieving net zero GHG emissions therefore requires that net emissions of CO_2 itself become negative. In many models that achieve well below 2°C, net GHG emissions also continue to fall and are net negative by the end of the century.
2. **Net zero anthropogenic CO_2 emissions** – when anthropogenic emissions of **CO_2** from all sources equal anthropogenic sinks of CO_2. When net zero anthropogenic CO_2 emissions is reached, CO_2 concentration in the atmosphere will continue to fall due to the natural CO_2 sinks.

A third and more controversial interpretation has emerged since Paris, and is gaining some traction, including with the CMI.

3. **Net zero GHG emissions including natural sinks** - when emissions of all the GHGs equal the total of **all** (anthropogenic plus natural) sinks of CO_2. When this happens, the GHG concentration in the atmosphere is effectively stabilized (the ultimate goal of the UNFCCC) but global temperature will continue to increase over centuries due to the thermal inertia of the oceans. Including the natural sinks in the definition results in higher anthropogenic emissions at the point that net zero is reached, and

[1] Covered by the Kyoto Protocol expressed as carbon dioxide equivalent using 100 year Global Warming Potentials

all other things being equal this will result in a larger temperature increase. Likewise, if a specific integrated assessment model were to be run to achieve the lowest cost pathway to a given temperature goal, then net zero (including natural sinks) will be achieved much earlier than net zero (excluding natural sinks). If the temperature goal is set high enough (but still within 2°C), then net zero (excluding natural sinks) may not be required within the 21st century.

All other things being equal, these three possible interpretations of net zero therefore yield three quite different possible outcomes in terms of the "carbon budget" for anthropogenic GHG emissions and for the resulting temperature rise:

1. **Net zero anthropogenic GHGs**: This interpretation constrains anthropogenic emissions the most, and leads to the lowest temperature rise.
2. **Net zero anthropogenic CO_2 emissions:** This interpretation constrains anthropogenic emissions less, and leads to a higher temperature rise.
3. **Net zero GHG emissions including natural sinks:** This interpretation creates considerably more room for anthropogenic GHG emissions and leads to the highest temperature rise.

The current most prevalent interpretation of the Article 4 text is the first and most stringent - that in the long term, emissions of CO_2 and other GHGs will only be possible if there is an equivalent **anthropogenic** sink, either through anthropogenic enhancement of natural sinks or through engineered solutions such as BECCS. This is the basis of Shell's publication - *A Better Life with a Healthy Planet - Pathways to Net-Zero Emissions*.

When should net zero be achieved?

A second critical factor in determining the actual carbon budget and consequent temperature rise is the date by which net zero should be achieved. Article 4 states that the "balance" (net zero) should be achieved "in the second half of this century." Precisely when in the second half of the century that net zero needs to be achieved depends on a number of factors:

- Whether the second half of this century refers to 2050, 2099, or an average over the period from 2050-2100.
- What is meant by well below 2°C.

- Whether the temperature goal of the Paris Agreement refers to the temperature in 2100 or the equilibrium (long term) temperature increase.
- Improved understanding of the science, particularly the magnitude of the natural CO_2 sinks in the future.
- The definition of net zero.

Results from the integrated assessment models assessed by IPCC in their Fifth Assessment Report suggests that;

- A 50% probability of limiting temperature increase to 2°C would require net zero (excluding natural sinks) GHG emissions around the end of the century.
- A 66% probability of limiting temperature increase to 2°C would require net zero (excluding natural sinks) GHG emissions well before the end of the century.
- A 50% probability of limiting temperature increase to 1.5°C would require net zero (excluding natural sinks) GHG emissions around the start of the second half of the century.

Actions of governments

Regardless of the interpretation of 'net zero' and the 'balance' text, what matters most is the view taken by Parties in developing their mid-century low GHG emissions strategies (MCS) under Article 4 "mindful of the temperature goals in Article 2". There have been relatively few submitted to UNFCCC to date, including just four from developed countries and they all translate their contribution towards the Paris temperature goals into a GHG emissions reduction target:

- Germany – 80 to 95% reduction by 2050 compared to 1990.
- France – 75% reduction by 2050 compared to 1990.
- US – 80% reduction by 2050 compared to 2005.
- Canada – 80% reduction by 2050 compared to 2005.

All of these are on a net GHG emissions basis ie including land use change, but without accounting for natural sinks. Only Canada relies on the use of international emissions trading and land sector credits to achieve 15% of its target, i.e. 65% is from reduction in domestic net GHG emissions.

Achieving the Paris goals – well below 2°C / net zero

There are numerous different pathways to net zero produced by

different organisations/agencies, some of which are technology neutral, others with an inbuilt bias towards renewables and against long term use of fossil fuels. There is also significant uncertainty in the allowable carbon budget to limit the temperature rise to the level desired with the desired probability. However, it is clear that the Paris goals can only be achieved with a transformation of the energy system and many other systems and sectors upon which the economy relies, such as infrastructure, forestry, agriculture and other land use. In other words, at some point, there will be no more "offsets" for emissions from energy as all reductions will be needed.

It is also clear that, if the Paris goals are to be achieved, large scale use of fossil fuels for energy supply in the second half of the century will only be possible with large scale deployment of CCUS to directly mitigate some of the fossil CO_2. In addition, CCUS will also need to be used on biomass to draw down CO_2 from the atmosphere to allow some use of unmitigated fossil fuel combustion and emissions of other GHGs. Shell present what they regard as a plausible outcome for the end of the second half of the century, where there is still a substantial demand for oil, gas and coal, but only if 12 Gt of CO_2 is injected into the deep sub-surface annually. On a mass basis, this is equivalent to about 3 times current production of crude oil.

The Low Emissions Opportunities (LEO) workstream of OGCI is undertaking a study to identify and assess the different potential pathways and options relevant to the oil and gas sector needed to meet the long term Paris goals. The results from the study are expected to be available for the 3rd OGCI annual report later this year, though results may be delayed.

Conclusion

Future projections of GHG emissions and hence of the long-term future use of unabated fossil fuels depend on many factors, including the temperature goal and the desired probability of achieving it, as well as an evolving understanding of the science. The precise interpretation of achieving a balance between sources and sinks is just one more factor – and under all interpretations will be very challenging indeed.

Mike McMahon
22 May 2017

Appendix A: Examples of natural and anthropogenic sinks of carbon dioxide

Natural sinks	Anthropogenic sinks
Net flux of carbon dioxide from atmosphere to oceans.	Managed regrowth of deforested land – reforestation.
Increase in land (above and below ground) carbon stocks due to elevated carbon dioxide concentration in the atmosphere – the fertilization effect.	Conversion of land use to forest – afforestation.
Regrowth of forests on unmanaged lands e.g. northern hemisphere boreal forest.	Increase in land (above and below ground) carbon stocks due to improved forest management.
	Increase is soil carbon content due to altered agricultural practice eg low-tillage annual crops.
	Use of CCS in biofuel production
	Use of CCS on bioenergy power plants – BECCS.
	Direct capture and storage of CO_2 from the atmosphere.

Agenda Item 6: Forward agenda

Members of the Issues Management Working Group

IMWG 2017 agenda

The purpose of this IMWG session is to review and approve proposals for the remaining 2017 agenda.

Kathrina Mannion
22 May 2017

Members of the Issues Management Working Group

2017 forward agenda

The following issues are scheduled for discussion in September 2017**:**

- **Fossil fuel subsidies**: Calls to remove (inefficient) fossil fuel subsides continue to mount from certain stakeholder groups (e.g. IMF, NGOs, G20), particularly after the Paris agreement. Definitions of what is meant by a subsidy vary widely and there is a risk that the debate is dominated by an overly simplistic narrative. A high level position to respond to queries on this topic would be helpful.

- **Carbon, capture, use and storage (CCUS) (revision):** Our current position on CCUS needs refreshing for several reasons: its relevance to net zero; growing awareness of its key role to promote the role of gas in the energy transition; OGCI focus, etc. This discussion was postponed from the June meeting.

- **Life Cycle Assessment (LCA) (revision):** Our current position opposes LCA as the basis for detailed regulation, but supports LCA to guide high level policy (e.g. advocacy for natural gas, our position on electric vehicles). Our position needs updating to explain this apparent contradiction better. LCA is also a factor in standards such as ISO14001 which impacts BP businesses.

To accommodate moving CCUS to September, a few other changes are suggested to the September and subsequent agendas: climate change adaptation should be pushed back to December and a position on energy access should be deferred to 2018. As agreed in March, net positive approach will be covered as part of the position on BP's contribution to society in December rather than having a separate information note.

The full 2017 agenda is at Appendix 1 for information.

Kathrina Mannion
22 May 2017

Appendix 1: Full IMWG agenda for 2017

Issue	Lead	Type	Notes
March IMWG			
Climate change - General position - BP programme of action - Paris agreement	Group Policy	**Revision (at least 3 existing positions)**	We have several positions on climate change (a general overview, BP's programme of action and the Paris agreement and many more). One year on from Paris, post-Marrakech and with company, sector and societal views evolving it is timely to reconsider both the substance of our views on climate – and whether to consolidate or retain the suite of positions in which they are described.
Modern slavery	Group Policy/ S&OR	**New**	Interest in modern slavery has significantly increased, particularly within the UK with the introduction of the UK Modern Slavery Act. However, the risks to BP are worldwide. A robust position is needed to respond.
June IMWG			
Carbon offsets	Group Policy	**Revision**	Our position on carbon offsets was agreed in 2013. An updated position is required to respond to growing BP and stakeholder interest in forestry offsets, the use of offsets following Paris, in aviation etc., and to reflect a more active advocacy stance which maximizes opportunities for BP.
Net zero emissions	Group Policy	**Information note**	The Paris agreement aims for a "balance between anthropogenic GHG emissions by sources and removal by sinks in the second half of this century", widely referred to as "net zero" emissions. This concept is complex to understand but important with regard to how the Paris agreement is interpreted and implemented.
September IMWG			
Fossil fuel subsidies	Group Economics / Group Policy	**New**	Calls to remove (inefficient) fossil fuel subsides continue to mount from certain stakeholder groups (e.g. IMF, NGOs, G20), particularly after the Paris agreement. Definitions of what is meant by a subsidy vary widely and there is a risk that the debate is dominated by an overly simplistic narrative. A high level position to respond to queries on this topic would be helpful.

Issue	Lead	Type	Notes
Carbon, capture, use and storage (CCUS)	Group Tech / Group Policy	Revision	Our current position on CCUS needs refreshing for several reasons: its relevance to net zero; growing awareness of its key role to promote the role of gas in the energy transition; OGCI focus, etc
Life Cycle Assessment (LCA)	Group Policy/ S&OR	Revision	Our current position opposes LCA as the basis for detailed regulation, but supports LCA to guide high level policy (e.g. advocacy for natural gas, our position on electric vehicles). Our position needs updating to explain this apparent contradiction better. LCA is also a factor in standards such as ISO14001 which impacts BP businesses.
December IMWG			
BP's contribution to society	Group Policy / Group Comms	New	The positive contribution of BP to individual economies (e.g. UK and US) has been well articulated but a single coherent response regarding our positive global contribution to economies and societies has never been developed. It would be helpful to put forward a positive position and to help underpin our positions in other areas, e.g. SDGs The concept of net positive approach - where businesses demonstrate positive environmental or societal impacts in key areas of their operations - is also gaining some traction
Revenue transparency	Group Policy	Revision	Our current position was agreed in early 2013 and is now out of date. It would benefit from a refresh to reflect changes in the external environment and internal approach.
Climate change adaptation	S&OR/ Group Policy	Revision	Adaptation has attracted a lot more attention since our position was last agreed. A more 'on the front foot' position, with more specifics on what we are doing operationally and how important this is would be helpful to respond to this interest.
Circular economy	S&OR	Information note	Interest in the need to move towards a circular economy (i.e. re-using, repairing, refurbishing and recycling existing materials and products, where 'waste' can be turned into a resource) continues, e.g. the European Commission published a circular economy strategy in December 2015. It would be useful to better understand implications.

Appendix: Climate related positions

Positions on climate change and policy and practice to mitigate or adapt to it

BP programme of action on climate change

Key messages

- Within a clear policy framework **energy companies have a key role** to play by deploying innovative technological and commercial solutions at scale and BP wants to play its part.
- We were one of the first large companies to **limit our GHG emissions voluntarily** and we **continue to take practical steps**.
  - We factor an **internal carbon price** into investment appraisals and engineering designs for large new projects. In industrial countries this is **$40 per tonne of CO_2**.
  - We incorporate energy use considerations into business plans and assess, and prioritize and implement technologies and systems to **improve energy usage**.
  - We have endorsed and are working towards the World Bank goal of **zero routine flaring by 2030**.
  - We are taking steps to **reduce the methane emissions** from our operations.
  - We improve the overall **efficiency of use of our fuels and engine oils** in partnership with car and equipment manufacturers (e.g. Ford, Suzuki & Toyota).
  - We invest in **lower-carbon energy development**:
    - **Natural gas**, which emits about half the carbon of coal when used for power, and is cleaner, secure and affordable. Gas makes up about half our current Upstream portfolio, and is growing.
    - Low cost, low carbon **biofuels** that are either financially self-sustaining or could be in the future.
    - Onshore **wind in the U.S**.
    - Investments in **innovative low carbon businesses**.
  - We continue to **improve our understanding** of climate change policy, risks and impacts through supporting research and science.
  - We have joined with other oil and gas companies – through **the Oil and Gas Climate Initiative (OGCI)** and other activities – to support effective action on this critical issue.
  - We also take relevant steps to make our operations resilient to the potential **physical impacts of climate change**. We require new projects to assess their risk from physical climate change impacts and provide guidance to our operations on making themselves resilient.

Related briefs: Biofuels, Carbon Offsets, Climate change, CCS, Greenhouse gas (GHG) emissions policy, Low carbon fuel standards, Life cycle assessment, Methane, Paris climate agreement, Role of natural gas, Unburnable carbon, US carbon tax.

Additional information

Action to understand climate policy risk

We form a deep understanding of the science, technology, economic and political factors affecting climate change policy:

- Science, technology and policy research: we deepen our understanding of climate science and future energy technology and policy trends through in-house research and in partnership with leading academics.
- Energy and CO_2 projections: we publish *BP Energy Outlook 2035* that projects future global and regional patterns of energy demand and supply, and related CO_2 emissions.
- Education and outreach: we engage governments, NGOs, industry organizations and others on issues relating to energy and climate change.

Action to understand risk from physical climate impacts and improve resilience

- We support science and research at Imperial College and Princeton University to help us predict possible climate impacts relevant to our operations, as well as to better understand how extreme weather events relate to global climate change.
- We require new projects to assess and take steps to manage their physical risk from climate change.
- We provide OMS guidance to projects and operations with practical advice on how to assess the degree of risk from climate change impacts and how to develop appropriate resilience plans.

BP's contribution to international climate policy

- BP publishes major analyses of the factors affecting long term global demand and supply of energy and their implications for GHG emissions, such as *Energy Outlook 2035*, including a "faster transition" scenario, *Technology Outlook 2050* and *The Energy Sustainability Challenge*.
- BP has joined the Oil and Gas Climate Initiative (OGCI) a voluntary CEO led industry initiative that aims to catalyse meaningful action on climate change.
  - OGCI published its first report in October 2015 ahead of the Paris Climate Summit.
  - It focuses on a number of key areas including role of natural gas, carbon, capture and storage (CCS), long term solutions and carbon reduction instruments and tools.
  - Current members: BP, CNPC, Eni, PEMEX, Reliance Industries, Repsol, Saudi Aramco, Shell, Statoil and Total.
- BP, along with 5 other companies, sent a joint statement to the UN in support of carbon pricing ahead of the Paris agreement. This 'Paying for Carbon' coalition continues to support efforts to promote carbon pricing.
- BP also participates in other climate activities and initiatives:
  - Carbon Pricing Leadership Coalition (CPLC)
  - IPIECA long term climate vision and Paris Puzzle
  - World Bank Zero Routine Flaring by 2030 initiative.
  - Climate and Clean Air Coalition Oil and Gas Methane Partnership (CCAC - OGMP)
- We participate in relevant industry trade associations with climate policy programmes:
  - World Business Council for Sustainable Development (WBCSD), Sustainable Mobility Programme
  - International Emissions Trading Association (IETA), Business Partnership for Market Readiness
- We have endorsed major statements on international climate policy such as the World Bank statement on carbon pricing and the Cambridge Institute for Sustainability Leadership (CISL) Communique on Carbon Pricing.
- We participate in independent sector climate dialogues such as the C2ES Business Council Work Group on International Climate Policy

Contact Paul Jefferiss

Carbon pricing

Key messages

- Governments must provide a **clear, stable and effective policy framework** if companies are to provide and use energy competitively, and limit GHGs.
- A well-designed **carbon pricing framework** is the most comprehensive and economically efficient policy to limit GHG emissions – and **should be introduced**. It would make energy efficiency more attractive and lower-carbon energy sources more cost competitive.
- We have **no preference** between **cap and trade** and **carbon taxation** to create a carbon price. **Either policy** can be effective and is acceptable if it is **well-designed**. Clear, stable and predictable rules are key.
- The **carbon price** should be applied to all sectors **economy-wide** – unless overlapping or duplicative policies already exist, for example for transport.
- Governments should set the level of the carbon cap or tax and allow it to deliver **environmental outcomes at least cost**, with minimal interference to constrain or manipulate prices or favour specific technologies.
- We are **pleased the Paris Agreement creates the possibility for carbon pricing** to help deliver global goals and national contributions. We recognise different national prices are a necessary and practical first step but would like to see convergence towards a single global carbon price over time.
- Until approximate global carbon pricing equivalence exists, domestic **sectors** or installations that are energy-intensive and **exposed to unequal international competition** should be given **protection** from the national carbon price.
- Targeted additional measures can:
  - **Promote research and development** – to catalyse innovation to provide low-carbon options for the future.
  - **Raise public awareness** – to highlight the energy challenges the world faces, and potential solutions.
  - **Promote energy efficiency** – to reduce the amount of energy consumers use.
  - **Help emerging low carbon technologies** – to become commercial.
- BP is a member of the Carbon Pricing Leadership Coalition – bringing together government, private sector and civil society to expand the use of carbon pricing.
- We also factor an internal carbon price into investment appraisals and engineering designs for large new projects.

Related briefs: Biofuels, Carbon offsets, CCS, Climate change, Life cycle assessment, LCFS, Methane, Paris climate agreement, Unburnable carbon, US carbon tax.

Additional information

Carbon pricing

- To limit global pollutants such as GHGs, carbon pricing is much more efficient than command and control regulation, which incurs a much higher economic cost and should

be avoided unless a clear market failure exists (see below).

- To create a carbon price, we have no preference between cap and trade and taxation. Either policy can be effective and is acceptable if it is well designed to:
  - Be revenue neutral, with revenues returned to the economy in a non-distortionary manner, e.g. via corporation and income tax reductions.
  - Be simple in design and implementation.
  - Avoid duplication with other policies. Overlapping climate policies (e.g. renewables targets) should be reduced or removed.
  - Follow clear and stable rules.
  - Offer reasonable price predictability. This can be achieved by a tax or by a deep and liquid trading market.
  - Facilitate cost pass through for carbon prices applied to products. BP should not be placed at a disadvantage if it is expected to collect consumer revenues (taxes or allowance costs) on behalf of government – maximum cost pass through should be the goal.
  - Create price transparency to help cost pass through and foster behaviour change.
  - Be consistent in its application. The price should be applied on a consistent basis economy-wide (to emissions when burned near the point of combustion not Life Cycle Assessment).
  - Preserve fair competition among peers, sectors, and nations.
    - The instrument should not disadvantage BP relative to its oil and gas competitors, or favour one sector (e.g. power) over another (e.g. refining).
    - Domestic sectors or installations that are energy-intensive and exposed to unequal international competition should be protected from national carbon prices until approximate equivalence of global carbon pricing exists. This is preferable to taxing imported products, because it supports exports, is less politically divisive, and avoids life cycle accounting.

Transitional incentives

In a few cases, targeted measures may be justified, for example:

- Support for research and development to catalyse innovation to provide low-carbon options for the future.
- Education to raise public awareness to highlight the energy challenges the world faces, and potential solutions.
- Standards to accelerate consumer uptake of energy efficient appliances, vehicles or buildings.
- Transitional incentives to help emerging low carbon technologies (CCS and renewables) overcome deployment barriers. Incentives should be:
  - Tightly focused on technologies with objective potential for significant cost reduction and significant carbon savings
  - Truly transitional (i.e. gradually reduced and finally removed)

  Barriers justifying transitional incentives include:
  - High capital costs to demonstrate or deploy new technologies and infrastructure.
  - The absence of suitable market infrastructure, business models and incumbent behaviour.

Contact Paul Jefferiss

Climate change adaptation

Key messages

- BP accepts the IPCC findings that the **impacts of climate change** such as changing precipitation and melting snow and ice are widely **apparent** and will likely become **more severe** even if substantial action is taken to mitigate GHG emissions.
- We believe that **policies are needed to encourage action** to adapt to climate impacts as well as to reduce the GHG emissions that cause them.
- Adapting to climate change means **strengthening resilience,** e.g. of infrastructure. We recognise investment may be needed, amid uncertainty on how severe the impacts may be.
- Climate change **could impact BP's facilities** and infrastructure and also cause **socio-economic disruption** as a result of e.g. water or food scarcity.
- BP manages this by:
  - **Supporting science and research** to help us understand the potential impacts caused by climate change.
  - Requiring new projects to **assess** their **risk** from climate change.
  - Providing **OMS guidance** to characterize climate change risk and approaches to manage it.
- BP believes it is for **governments to take appropriate steps** to increase the resilience of other systems on which BP business depends. Dialogue and partnerships are preferred over direct regulation.
- An effective climate change adaptation response requires the **cooperation of many parties**, including governments, the private sector and individuals.

Related briefs: Climate change

Additional information

Definitions

- Climate change adaptation is what society will need to do to cope with the effects of climate change. This includes changes in processes, practices, and infrastructure to deal with potential damage or opportunities.
- Climate resilience focuses more on creating robust responses to the anticipated negative impacts, and is an essential part of climate adaptation

Potential impacts on BP

Climate impacts could occur in all regions where BP operates:

- Greater frequency and severity of extreme storms, floods, and sea level rise, could require increased investment to fortify or relocate existing operations, and increase the costs of operating.

- Failure or constraints in transportation infrastructure could increase cost and affect our ability to receive supplies and ship our products, especially for aging road and rail infrastructure.
- Over the longer term, climate change could cause economic disruption or water or food scarcity, resulting in regional social instability which could in turn affect our ability to do business even if our facilities are physically protected.
- Warming climate and changed rainfall patterns could cause regional fresh water scarcity, which could limit water available for refining or production.
- Impacts will vary according to geography. For example, operations at our onshore Arctic assets would need to change to adapt to warming permafrost and shorter winters.

Practical steps BP is taking

- We sponsor research at leading academic institutions such as Imperial College (UK) and Princeton University (US) to develop specialized climate models. These help us predict possible climate impacts relevant to our operations, as well as to better understand how extreme weather events relate to global climate change.
- We have participated in the National Petroleum Council's work on emergency preparedness and infrastructure resilience.
- Our major projects are required to assess and manage the risk from climate change. For example, the Alaska Liberty project identified that historical design criteria may not be an adequate predictor of the future. These criteria need to be re-evaluated so that project design and planning account for warming permafrost and changing sea ice conditions.
- The OMS group guide 'Adapting to a Changing Climate' provides projects and operations with practical advice on how to assess the degree of risk from climate change and how to develop appropriate resilience plans.

The role of government

- We believe that national governments should develop and implement national strategies to prepare for the future impacts of climate change irrespective of the level of GHG emission reduction they require.
- Regional and local plans should then contain elements to assist all relevant parties, including the private sector, to manage such risk. This would include the development of resilient infrastructure and business processes.
- As part of the international process, less developed countries may require assistance from other countries to develop and implement climate adaptation plans.

Contacts: Paul Jefferiss / Eamonn Naughton

The Paris climate agreement

Key messages

- BP welcomes the direction provided by the Paris Agreement, for countries to determine their contributions to holding temperature rise well below 2°C.
- We will continue to work in our own right and collaboratively with other companies in the Oil & Gas Climate Initiative (OGCI) to evolve our businesses towards and help deliver the aims of the Agreement.
- The Oil and Gas Climate Initiative (OGCI) has identified 4 important measures to drive further progress towards reducing GHGs: energy efficiency; more natural gas in the energy mix; further research and development; partnerships and multi-stakeholder initiatives.
- BP has joined other important climate initiatives:
  - World Bank Zero Routine Flaring by 2030 goal.
  - Climate and Clean Air Coalition (CCAC) Oil & Gas Methane Partnership (OGMP).
  - Carbon Pricing Leadership Coalition (CPLC).
- We are pleased the Agreement creates the possibility for carbon pricing to help deliver global goals and national contributions.
- We continue to work with relevant stakeholders to play our part.

Related briefs: BP programme of action on climate change, Climate change, Carbon pricing

Additional information

The Paris agreement

- On 12th December 2015, all the governments involved adopted the Paris Agreement. The Agreement is for implementation post-2020, and will come into force when it has been ratified by at least 55 participating countries, representing at least 55% of global GHG emissions.
- The Agreement maintains the expectation that developed countries should take the lead and support the efforts of developing countries. But for the first time the Agreement binds all participating countries to its provisions, and encourages voluntary contributions by developing countries.

Long-term temperature objective

- The Agreement aims to "hold global average temperature rise to well below 2°C above pre-industrial levels and to pursue efforts to limit temperature rise to 1.5 °C above pre-industrial levels."

Emissions reduction goals

- There is no quantitative long-term emissions goal but countries "aim to reach global peaking of GHG emissions as soon as possible … and to undertake rapid reductions thereafter … to achieve a balance between anthropogenic emissions by sources and

removals by sinks of GHGs in the second half of this century."[1]

- The Agreement places binding commitments on all parties, from 2020, to:
  - Make "nationally determined contributions" (NDCs) – i.e. climate pledges. Developed country NDCs should include absolute emission reduction targets, and developing countries are encouraged to move over time towards them.
  - Pursue domestic measures aimed at achieving their NDCs.
- There is no binding commitment to achieve NDCs.

Reporting and review of national contributions

- The Agreement places binding commitments on countries, starting by 2023 and repeated every 5 years after that, to:[2]
  - Report on their emissions and progress made on their NDCs.
  - Undergo international review of collective progress.
  - Submit new, more ambitious NDCs every five years
- The principle of transparency in accounting and reporting is included in the Agreement but the detailed mechanisms are not.

International emissions trading and carbon pricing

- The Agreement describes how countries can pursue "voluntary co-operation" in the implementation of their NDCs – in other words, trade GHG emissions.
- It calls for a new mechanism to enable GHG emission reductions in one country to be counted toward another country's NDC, provided double counting is avoided.
- Carbon pricing is referenced positively as one possible domestic policy option.

Loss and damage from climate change impacts

- The Agreement recognises the importance of "loss and damage" resulting from climate change, and identifies the need and a cooperative mechanism to address it. But it explicitly states this does not "provide a basis for any liability or compensation."

Finance for developing countries

- The Agreement extends the existing goal for climate finance from $100 bn a year by 2020 to a minimum of $100 bn after 2025. The definitions of acceptable funds and funding vehicles are not yet clear.

Implications of the Paris Agreement

- For the first time, all participating countries are now bound to some form of climate policy post 2020, and to strengthen it over time. For many countries, in some of which BP operates, this will be their first engagement with climate policy.
- We will need to consider our response carefully. In the meantime our current positions and engagements remain unchanged.
- Key for BP businesses will be whether and how countries implement their NDCs, through carbon pricing, regulation or other mechanisms.
- Current INDCs will not deliver a well below 2°C temperature goal. The current INDCs have been estimated to result in a temperature rise of around 2.7-3.5 °C.
- The inclusion of support for international emissions trading and market mechanisms could lead to carbon pricing, potentially reducing the cost of achieving emissions reductions substantially.

Contact Paul Jefferiss

[1] Being interpreted by some to mean "net zero" emissions, itself undefined.
[2] A pre-implementation review of emissions is scheduled for 2018 to see if the initial Intended Nationally Determined Contributions (INDCs) for implementation post-2020 are adequate. This and some other provisions are contained in a "Decision" of the Parties, to which the Paris Agreement is appended. For brevity this note refers to both as "the Agreement".

Unburnable carbon

Key messages

- **We believe action on climate is needed.** But it's a complex issue – one needs to consider all aspects of this debate in their totality.
- **Access to affordable and secure energy is essential for economic prosperity.** We expect global demand to grow by 30% by 2035, driven by the developing world. A diverse mix of energy sources, including fossils fuels, will be required.
- **There are multiple actors and actions**. Agriculture and land use emit about a quarter of global GHGs. Slowing deforestation could dramatically reduce CO_2 and help protect the world's biodiversity.
- **All fossil fuels are not equal**. Coal accounts for about 60% of potential CO_2 emissions from known fossil reserves and is the most carbon intensive fossil fuel. Natural gas is an affordable replacement in coal-fired power, cutting CO_2 emissions in half. The transition from coal to natural gas needs to be effected in the evolving energy mix.
- **There is a variety of resource holders and users**. National oil companies control about 90% of known oil reserves. Consumers account for about 90% of CO_2 emissions from oil products.
- **BP will continue to play its part.**
  - We invest in lower-carbon energy, and our current portfolio is about half gas and half oil, with a growing proportion of gas.
  - We focus on energy efficiency in our operations and our products.
  - We support an economy-wide carbon price.
- **Valuations are based on proved reserves, which are not "stranded assets"**. The upstream part of BP's business value is mainly based on *proved reserves*, and less so estimates of *probable* or *possible reserves*. BP's proved reserves are produced, and historically replaced, over a 13 year timeframe on average. On this wavelength we can adapt our investment strategy to changes in policy, market or technology conditions.
- **To do this, we take a dynamic approach:**
  - GHG regulation: We apply a carbon price to our investment decisions, where relevant.
  - Supply and demand: We make regional and global assessments of energy supply and demand.
  - Fluctuating oil prices: We test our investments against a range of oil and gas prices.
  - Evolving technology: We undertake periodic and thorough reviews of potential innovation in the 2030-50 timeframe and collaborate with external technology-focused bodies.

Related briefs: Climate change, CCS

Additional information

Unburnable carbon and stranded assets concepts

Proponents of these concepts assert that:

- Burning all fossil fuel reserves would increase CO_2 concentrations well above 450ppm, and probably raise temperatures by > 2˚C.
- Potential GHG regulation could make some reserves unburnable, or 'stranded assets'.
- Companies holding assets that are stranded should have their value cut.
- Companies should consider this on top of other risks when making new investments.

BP views on the unburnable carbon concept

- Fossil fuels are not equal. Coal has the highest CO_2 emissions intensity, followed by oil, followed by gas.
- Based on global reserves assessments, coal accounts for 60% of potential emissions, followed by oil at 25% and gas at 15%.
- Oil and gas reserves are not all alike in how they are defined or estimated. There is a greater level of confidence in producing proved company reserves than there is for various global reserves assessments – and proved company reserves are produced over shorter timescales (average 13 years for supermajors).
- Where companies are quoted on the US market, they are obliged to report proved reserves under SEC (Securities and Exchange Commission) rules. It is these proved reserves that are most correlated with upstream company valuations and are most likely to be produced.

BP's approach

- Carbon policy risk: we undertake cross-business policy reviews (EU carbon policy, carbon offsets), and detailed quantitative analysis and long-term natural resource assessments (Energy Sustainability Challenge). Externally, we deepen our understanding of future policy trends through our work with leading universities (Harvard, Princeton, Oxford, Tufts).
- Supply and demand risk: we make regional and global assessments of overall energy supply and demand (Energy Outlook 2035) and detailed, region- and technology-specific, bottom-up demand models for the transport sector (Demand/Product 2050). We compare these with other recognised assessments (IEA World Energy Outlook).
- Price sensitivities: we use a range of oil price assumptions in making all financial investment decisions and we factor a carbon cost into investment appraisals and engineering designs for large new projects. In industrialized countries this is $40 per tonne of CO_2 and we stress test at $80 per tonne.
- Technology risk: we undertake deep-dives into plausible technology developments in the 2030-2050 timeframe (our Long-term Technology View) and collaborate with external research organisations.
- Operational efficiency: we incorporate energy use considerations into business plans and assess, prioritize and implement technologies and systems to improve energy usage. We develop more efficient fuels, lubricants and other downstream products.
- Lower-carbon energy development: we focus on natural gas value chains and alternative fuels, such as bio-ethanol. BP has already developed lower carbon energy technologies which could be economic with a system-wide carbon price.

Contact Dominic Emery

US carbon taxation

Key messages

- BP supports an **economy-wide carbon price** as the most efficient means of limiting CO_2 emissions.
- We have **no preference** between **cap and trade** and **carbon taxation** to create a carbon price. **Either policy** can be effective and is acceptable if it is **well-designed**.

Related briefs: Climate change, Carbon pricing, BP programme of action on climate change

Additional information

Carbon policy

- The policy framework for reducing the carbon intensity of the economy should aim to minimise the social cost of doing so.
- A carbon price is the best policy to achieve this. Additional measures for carbon reduction should be limited to those, if any, for which a market failure, with a carbon price, can be clearly identified. These include:
  - Targeted and time-limited "transitional incentives" for emerging low- carbon technologies with significant carbon abatement and cost reduction potential (e.g. some renewables and CCS).
  - Support for energy efficiency.
  - Support for innovation and R&D.
  - Support for some large, shared infrastructure (e.g. for fuel distribution).

Carbon tax within the US

- Strategically, the introduction of a carbon tax should ideally leave BP "no worse off" than without it. This implies an equal reduction in other tax (e.g. corporation tax) or regulatory cost (e.g. CAA), or an increase in tax credit.
- A well-designed carbon tax should have the following features:
  - It should address CO_2 reduction as its primary purpose.
  - It should be applied to CO_2 equivalent emissions when burned (not life cycle emissions), based on accurate data reporting and verification.
  - It should be simple and transparent and increase only gradually and predictably.
  - It should be applied consistently across all sectors of the economy, including transport.
- A carbon tax should also not structurally discriminate against our sector or company, domestically or overseas. This means that:
  - The point of regulation (and other design elements) should not place BP revenues

or margins at risk, or otherwise structurally disadvantage BP relative to its competitors.

- The structure should not allow for Government interference with the industry's ability to pass through new customer taxes.
- Domestically refined and imported products should be treated in an exactly equivalent manner.
- Sectors (e.g. refining) objectively shown to be subject to international competition should be given transitional protection.
- Other sectors or groups objectively shown to be disadvantaged should be given transitional support.

Contact Paul Jefferiss

Positions on resources and technologies to address climate change

Carbon capture and storage

Key messages

- Carbon capture and storage (CCS) is the only technology that could **enable continued large-scale use of fossil fuels** in a tightly carbon-limited world.
- **CCS for pure sources of CO_2** (e.g. associated with natural gas sweetening) is **inexpensive** (ca $15/te) **but** remains **uneconomic without a carbon price** and/or value from **enhanced oil recovery (EOR).**
- **CCS for power (dilute CO_2) faces significant barriers:**
  - High costs with commercial complexity along the value chain.
  - A limited number of demonstration projects.
  - Technical challenges (e.g. reservoir dynamics and risk of leakage).
  - Community concerns.
  - Uncertain business, policy and regulatory environment.
- Hence BP is **maintaining a reduced, but relevant capability** to manage the growing risk of Carbon and Climate regulation that may require CCS for some businesses, and to support CO_2 EOR opportunities.
- We believe the following steps are needed **for CCS to be commercial at scale**, i.e. including power:
  - Significant **government funding for demonstration** and proof of concept.
  - **Transitional support** for wider deployment and cost reduction.
  - A sustained **carbon price** of around $100/tonne CO_2.

Related briefs: Climate change, Carbon pricing

Additional information

The potential for CCS

- CCS is one of a few technologies that could in theory help stabilise atmospheric CO_2 at safe levels.
- The IEA's 2°C Scenario assumes that CCS provides 1/6 of all CO_2 emissions reductions needed in 2050.
- Most energy economic analyses concur that it costs more to meet the climate change goals if CCS is not part of the solution.

Financial costs of CCS

- The current cost of CCS varies from $15/te CO_2 for niche applications to pure streams of CO_2, to >$150/te for applications to power. Support for technology development and large scale deployment could reduce the cost of power applications to <$100/te by 2050, and CO_2 for enhanced oil recovery (EOR) can provide an additional credit.

For CCS to be competitive in the long term, a sustained carbon price around $100/te CO_2 would therefore be needed.

- Even at these costs CCS is probably more affordable than other scalable options. An Energy Technology Institute (ETI) study, "Energy System Transition Analysis," estimated the option value of CCS to help meet the UK's CO_2 reduction targets as £32bn to 2030 and £263bn to 2050.

Other challenges for CCS

- CCS power projects are large in unit size, with high upfront capital costs and hence the rate of learning is slower than other low carbon power technologies.
- Commercial complexities along the CCS value chain include risk transfer, liabilities for CO_2 storage and the different market structures required by the different players.
- Uncertainty around governments' willingness or ability to meet CO_2 reduction targets does not create a business environment conducive to CCS investment.
- Storage capacity estimates whilst significant, need additional appraisal and development in order to de-risk geology for sufficient injectivity and secure containment that is in close proximity to CO_2 sources.

Governments and CCS

- Only limited funds for a few large power demonstration projects have been committed:
  - Canada and Alberta have provided $865m and double offset credits to Shell for its Quest CCS project, due to start-up in 4Q 2015.
  - The US has provided $1.7bn to 4 Clean Coal Power and 2 Industrial CCS projects.
- Governments have not yet put in place the necessary market-based policies (CO_2 pricing) that might eventually rise high enough to support wide scale deployment. Even pure CO_2 is vented today absent regulation or a carbon price.
- Governments have not adequately addressed long term liabilities for CO_2 storage.

The energy sector and CCS

- Most major oil and gas companies are building capability in CCS and have deployed the technology where mandated or in conjunction with enhanced oil recovery.
- There are 22 large-scale CCS demonstration projects: 14 operational and 8 under construction. Operational projects (including use of CO_2 for EOR) capture 27.4mtpa.
- The first CCS project with power (coal in Canada) started operations in 2014.
- Power companies are hesitant about CCS, due to the scale and cost challenges, and are unwilling to invest until appropriate market conditions are put in place by government.
- Equipment suppliers have invested heavily in CO_2 capture technology and are pressing government for CCS support to recoup their investment.

BP and CCS

- BP was a leading CCS exponent and proponent but has scaled back its activities and advocacy significantly since 2011 following withdrawal from the Hydrogen Energy business and due to lack of commercial application in the current portfolio.
- BP's CCS activity is focused on maintaining relevant capability to manage regulatory risk and support business needs. We participate in technology development through the CO_2 Capture Project, the UK's ETI and the Canadian Oil Sands Innovation Alliance (COSIA). We are also members of the CO_2 Capture and Storage Association (CCSA), the EU Zero Emissions Power Technology Platform (ZEP), and the North American CO_2 Capture and Storage Association (NACCSA).

Contact Gardiner Hill

Carbon offsets

Key messages

- BP supports high quality carbon offsets as **one option for compliance** with regulatory GHG reduction requirements, as offsets enable reductions at a lower cost.
- BP's **choice to use regulatory offsets** for compliance, where they are permitted and defined (Australia, California, Canada, EU ETS, New Zealand), is a business decision, managed by our integrated supply and trading function.
- BP **does not generally use voluntary carbon offsets** for core business activities or products. We limit our use of voluntary offsets to a few tightly-defined circumstances, using Target Neutral offsets.
- **Target Neutral** (TN) is a BP carbon reduction programme that provides our customers with the opportunity to voluntarily offset their mobility-related emissions.

Related briefs: Climate change

Additional information

Preferred criteria for high quality carbon offsets

- BP recognises that carbon offsets can be of variable type and quality, and face technical challenges. For this reason, we advocate that all offsets should be:
  - Real: they should represent actual GHG reductions in tons of carbon dioxide equivalent (CO_2e), and it must be possible to reliably estimate how much CO_2e was mitigated.
  - Additional: the reduction or capture of emissions should be incremental to what would have happened without the offset project or action in question.
  - Verifiable: a qualified, independent third party (or appropriate government agency) should confirm that the emissions were reduced or captured.
  - Permanent: any reversal of emission reductions (as may be the case with carbon capture and storage or forestry) should be accounted for and compensated appropriately.
  - Effective: the carbon offset, to the extent practically feasible, should be grounded in broad environmental integrity (e.g. it should not damage biodiversity).

BP's voluntary use of carbon offsets

- BP does not generally support the voluntary use of carbon offsets for core business activities or products, even where such offsets are regulatory grade and/or meet our criteria, for the following reasons. We believe they:
  - Do not create as much value as investing in our own emissions abatement projects.
  - Do not reduce compliance obligations or reported emissions.

- Could create precedent and expectation – e.g. to offset heavy oil or our whole operational GHG footprint.
- Could become an open-ended commitment – even after regulation has been introduced.
- Could open BP up to charges of greenwash – no matter how high the offset quality and integrity or the credibility of their validation.

BP's Target Neutral customer offer and our own use of it

- BP's TN programme purchases high-quality, independently verified voluntary offsets and retires them (after payment) on behalf of customers and the general public.
- We limit our own business use of voluntary carbon offsets, using TN offsets that meet our criteria, to three tightly defined situations:
  - Where our own activity is very similar to TN customer activity, and we might reasonably be expected to offset its emissions to avoid the charge of inconsistency and make the TN customer voluntary offsets offer credible. For instance, TN offsets emissions from the UK tanker fleet.
  - Where the business use of voluntary offsetting is the source of potential product differentiation, driven by demonstrated business customer demand. For example, BP Castrol and Acetyls are developing carbon neutral products.
  - Where a business, regional office, or corporate function would like to raise staff awareness of carbon emissions and the importance they have for their business operations and customers, for example by offsetting business travel.

Third-party carbon offset investments

- We invest directly in a range of carbon offset companies, funds and projects that meet compliance needs (or may in the future).
- These investments provide insights and knowledge in the short term in support of material and scalable offset options for the Group in the longer term.

Contact Paul Jefferiss

The electrification of road transport

Key messages

- **Plug-in electric vehicles (PEVs) are on the increase** and can bring positive air quality benefits, especially in urban areas.
- They can also help the **transport sector transition to a low carbon future**, provided the electricity source is low emissions. Electric vehicles using coal-fired electricity may not lead to lower emissions than conventional vehicles.
- The **scale and pace of plug-in electric vehicle growth** (currently less than 1% of all light vehicles) depends on customer adoption rate; fleet turnover; growth of conventional vehicles in developing countries; and future policy and regulation.
- **BP is actively engaged** in understanding customer trends and preferences in this area, and looking for opportunities to participate in this growing market.
- We expect **oil to still account for the lion's share of transportation fuels in 2035** due to lower cost conventional vehicles, higher energy density, rapid refuelling and scope for further efficiency improvements.

Related briefs: Biofuels, Carbon pricing, Climate change, Life cycle assessment

Additional information

BP activity on electric vehicles

- BP monitors and projects market and technology trends through our Energy Outlook, Long-term Technology View and Demand 2050 (our liquid fuels demand model).
- BP's downstream mobility taskforce has been set up to further understand and develop options for BP in respect of new business models, strategic partnerships, and venturing in this emerging market space.

Outlook for electric vehicles and liquid fuels demand

- Plug-in electric vehicles will increase their penetration into the vehicle fleet and are likely to have a significant impact on liquid fuels markets. The scale and pace will be determined by:
  - Customer preferences and lack of familiarity with new technology.
  - Technology barriers including slower refuelling, limited electric range, and higher cost of ownership.
  - Growing conventional vehicle fleets, especially in developing countries.
  - Future policy and regulation, including CO_2 regulation, incentives and lower liquid fuel duty income.
  - The impact of new business models, including ride-sharing and offers based on autonomous driving technology.
- Global liquids demand in 2035 is still projected to be higher than in 2015.
  - Demand growth will be led by developing economies with overall global growth lessened by decreased demand in the OECD.

  - BP's faster transition scenario, which limits CO_2 emissions more quickly than expected, suggests that up to 20% of global road fuel demand in 2035 could be removed. However, demand for road fuels would still be significant (greater than 40 million barrels per day).
- The IEA 450ppm scenario suggests that liquid fuels will still account for ca. 84% of transportation demand (Oil 72% Biofuels 12%)
- Increasingly stringent tailpipe CO_2 regulations, and growth of PEVs, will gradually curtail the growth of liquid road fuel demand. This will be dampened by the relatively slow pace of fleet turnover.

Car manufacturers and consumers

- Development and sales of electric vehicles will be a key aspect of car industry strategies, as they seek to comply with increasingly stringent tailpipe CO_2 regulations.
- Lithium-ion (Li-ion) batteries seem likely to remain the predominant vehicle battery technology. While the cost of Li-ion battery packs has fallen, parity with internal combustion engine technology is not expected soon without subsidies.
- Electric vehicles offer consumer benefits including lower fuel costs and CO_2 emissions, and quieter vehicles with strong acceleration. On the other hand they can have higher total cost of ownership (depending on utilisation levels), limited range, and/or slower refuelling.
- The number of plug-in electric models on sale is accelerating. In 2015, sales of plug in electric vehicles globally exceeded 500,000 (still less than 1% of car sales), but is likely to grow.

Policy and regulation

- Regulations to curtail tailpipe CO_2 emissions from cars have been enacted in many OECD and some developing economies (e.g. China). Regulation for medium and heavy duty vehicles may follow.
- The immediate burden of emission regulation falls on car manufacturers, who must persuade customers to purchase lower emitting, but more efficient, vehicles.
- Some countries offer subsidies and incentives to close the cost gap between plug-in electric and conventional vehicles.
- BP supports a level playing field for road transportation that considers fuel duty alongside an economy wide carbon price, as well as the life cycle impacts for all types of vehicles (including manufacturing and disposal of key components such as batteries).

Different types of electrification

- Electrification refers to vehicles that receive electricity from the grid.
  - Plug-in hybrid electric vehicles that are partly powered by electricity from the grid.
  - Battery electric vehicles that run only on battery power charged from the grid.
- These vehicles, owing to their substantial electric powered range, are likely to have significant impact on liquid fuels demand over the long term. They will also require investment to be made into local electricity distribution and vehicle charging infrastructure.
- Hybrid electric vehicles (such as Toyota Prius) that combine electric motors and an internal combustion engine, but do not use electricity from the grid for power, are sometimes also referred to as electric vehicles. Their greater efficiency is largely the result of more efficient internal combustion engine operation.
- Autonomous vehicles (i.e. driverless) can be either electric or powered by liquid fuels.

Contact: Robert Spicer / Richard Harding

Energy efficiency

Key messages

- Energy efficiency has **a key role to play** in meeting the global energy challenge. It helps with **affordability** because less energy is needed; **security** because it reduces dependence on imports; and **sustainability** because it reduces GHG emissions.
- There is **vast potential** for energy efficiency. Only about 12% of primary energy captured at source ends up as useful heat, light and motion.
- Policy makers see energy efficiency as a **major opportunity** to mitigate **climate change**. IEA estimates that energy efficiency could contribute about half of the emission reductions required by 2030 to stay on track for 2°C.
- Many cost effective energy efficiency improvements are not implemented.
- Energy efficiency measures are encouraged under an **effective carbon pricing** policy framework, which could help deliver GHG reductions at the lowest cost across the economy.
- In the absence of a carbon price:
  - **Targeted standards** may be justified to improve the efficiency of consumer appliances, cars and buildings.
  - Financial **incentives** may be justified to drive industrial energy efficiency.
- BP focuses on the efficient use of energy in our **operations and products:**
  - Upstream have a structured process to optimise energy use in major project design.
  - Each of our refineries set and track progress against a Solomon Energy Intensity Index (EII) target specific to its circumstances.
  - Energy intensity of our aromatics & acetyls portfolio has decreased by about 15-20% over the last 10 years.
  - BP and Castrol have developed a range of premium products that increase fuel efficiency for our customers and reduce CO_2 emissions.

Related briefs: Climate change, Carbon pricing, BP programme of action on climate change

Additional information

Policy context

- Policy makers have tried unsuccessfully for decades to overcome the barriers preventing the full uptake of cost effective energy efficiency opportunities.
- A carbon price will help close this so-called "energy efficiency gap", but not completely.

Impact on BP

- Risks: lower demand for products; the potential for direct regulation of BP's operations; and a stakeholder expectation, including investors, of improved

operational efficiency.

- Opportunities: competitive advantage from offering efficient products that allow our customers to gain value; an additional stimulus to improve operational efficiency and reduce costs.

Energy efficient operations

- We require our operations to incorporate energy use considerations in their business plans and to assess, prioritize and implement technologies and systems that could improve energy usage.
- *Upstream*: Where economic incentives or other local drivers exist, opportunities to improve energy efficiency are integrated into the facility planning and prioritisation processes, with examples including the North Sea and Azerbaijan regions. Our LNG operation in Tangguh uses combined cycle gas turbines and waste heat utilisation to achieve best-in-class energy efficiency.
- *Refining*: Our refineries track performance using the Solomon Energy Intensity Index (EII). Improvements are sought through changes in operating practices, maintenance activities, as well as through capital investments.
- *Petrochemicals:* Our aromatics & acetyls petrochemicals businesses track energy performance with the intensity metric of primary energy consumption per unit of production. Energy intensity of our aromatics & acetyls portfolio has decreased by about 15-20% over the last 10 years through deployment of proprietary PTA, PX and Acetic Acid technologies with world-class performance around process energy consumption.
- In 2015, BP joined the Climate and Clean Air Coalition (CCAC) Oil & Gas Methane Partnership (OGMP) and endorsed the World Bank Zero Routine Flaring by 2030 initiative. Reduction of methane emissions and flaring contribute to improved energy use.

Energy efficiency offers

- *Fuels:* BP Ultimate fuels in Europe currently deliver fuel economy benefits of up to 2.7% and 4.6% with diesel and gasoline respectively. The next generation of fuels (Topaz and Diamond) will achieve energy benefits of up to 6.8% on diesel and 7.0% on gasoline depending on the comparator grades in different markets.
- *Lubricants:* BP is developing fuel efficient engine and driveline (gear box and axle) fluids in partnership with multiple original equipment manufacturers (OEMs). These are sold globally, both directly to the OEM for factory fill, and into the aftermarket. Castrol branded products include: Castrol EDGE with Titanium Fluid Strength Technology for cars; Elixion and Vecton Fuel Saver for trucks. Fuel efficiency gains range from 0.5 - 2.5% for cars and up to 4% for trucks.
- BP's fleet fuel card offers customer access to driver training which includes driving for fuel efficiency.

Vehicle efficiency standards

- BP recognises there is a role for regulated efficiency targets for vehicles and believes they should be established by the vehicle manufacturers in partnership with regulators.
- BP believes that automakers, regulators and other stakeholders are best placed to decide the appropriate level of vehicle efficiency targets that can be technically achieved, that promote vehicle safety and are accepted by consumers.
- BP works closely with the auto industry to develop fuels and lubricants that help deliver vehicle efficiency and environmental targets.

Contacts: Paul Jefferiss / Liz Rogers

Renewable energy

Key messages

- Renewable energy has **a key role to play** in meeting increased demand while reducing greenhouse gas emissions – along with other lower emissions options such as coal to gas switching, energy efficiency and carbon capture use and storage.
- Non-hydro renewables are the **fastest growing energy source**, concentrated in the power sector. In our Energy Outlook, we estimate they are likely to form 10% of global primary energy supply by 2035, but this could rise to as high as 15-25% subject to policy and technology developments and consumer preferences.
- We believe countries should develop their renewable sectors **in line with the local characteristics** of their renewable resource base, which vary regionally.
- **BP has the largest operated renewables portfolio** among its peers. We are looking to grow our existing businesses, and explore new opportunities, including through our BP Ventures business.
- BP believes that in the long-term renewables can compete on a level playing field with other low emissions technologies, supported by a carbon price. Efficient gas power generation can play an important role as a back-up to intermittent renewables.
- We do **support time-limited "transitional incentives"** to help emerging low emissions technologies, including renewables and CCS, become competitive.

Additional information

BP and renewables

- Renewables include wind, solar, bioenergy, hydroelectric, geothermal, wave, and tidal. However, for our Energy Outlook analysis, BP considers large-scale hydroelectric power and traditional biomass separately from other renewables as they are subject to a very different set of drivers.
- Since 2005, BP has invested an initial $8billion in alternative energies, but the pace of policy, technology and consumer preference evolution has impacted outcomes. Our biofuels and wind businesses are operating cashflow positive.
- Wind: BP holds interests in 14 onshore wind farms in the US (operator of 13) with a combined generating capacity of 1432MW- sufficient to power homes in a city the size of Philadelphia.
- Biofuels: We operate three large modern sugarcane ethanol plants in Brazil. Since 2011, we have more than doubled our production of ethanol equivalent.
- BP is also preparing to commercialise biobutanol, in partnership with DuPont and AirBP is growing its biojet business.
- BP has extended its position in biogas through the acquisition of Clean Energy's renewable natural gas business, creating an advantaged biofuels platform in the US.

Outlook for renewables

- BP 2017 Energy Outlook base-case projects renewables' share of primary energy to rise from about 3.3% (including biofuels) in 2015 to around 10% by 2035, overtaking

nuclear's contribution by 2020, and matching hydroelectric by 2027.

- Some consumer sectors, (e.g. via corporate renewable power targets) are demonstrating an emerging demand for renewable energy.
- BP's Energy Outlook 2017's faster transition case, which assumes stronger climate policies, faster technology developments and evolving consumer preferences, projects renewables achieving a 16% share of primary energy by 2035. The even faster transition case, which delivers an emissions trajectory that matches the IEA 450 scenario, projects renewables achieving a 23% share by 2035.
- Power: In the base-case, renewables are projected to account for almost 50% of the growth in power generation, resulting in a ~20% share of global power by 2035.
- Transport: We expect biofuels share of total global transport to rise from about 3.0% in 2015 to ~4.3% by 2035 (5 - 6% of road transport).

Technical perspectives and challenges

- Overview
  - Renewable energy is a highly sustainable form of energy. In addition to GHG emission benefits, many renewables also have air quality benefits.
  - Renewables have made their fastest penetration in power due to lower costs and lower market barriers compared to transport and other sectors.
  - Wind and solar are very scalable, with wind currently the largest form of renewables globally. The biomass resource base varies geographically in type and quality. Geothermal, wave and tidal are likely to be relevant only in some locations.
- Costs - The costs of most renewables have fallen, in some cases quite sharply (i.e. solar PV, wind). However, in most cases they are still not competitive with fossil fuels particularly when the costs of intermittency are considered, and hence are reliant on regulatory support.
- Intermittency
  - The intermittency of wind and solar generation creates challenges in balancing power grid loads. The costs of wind and solar should be viewed on a system basis including maintaining the required reserves of dispatchable power.
  - Efficient gas power generation can play a key role as a back up to variable renewables.
- Energy Storage - To fully utilise the potential from wind and solar, cost efficient energy storage is required to store power when production exceeds grid demand. Some options exist (e.g. pumped storage), others (e.g. grid storage batteries) need development. Smart metering/demand side management could help match demand with supply.
- Infrastructure - Grid access can be a challenge for some renewables, e.g. remote wind.

Renewables policy

- We believe that in the long term renewables should compete with other energy supply options, including fossil fuels, supported only by a carbon price.
- Emerging low-emissions technologies may justify transitional incentives to help them overcome barriers to commercialisation and become competitive. These must be:-
  - Limited to technologies with proven potential for cost and GHG reduction.
  - Time-limited only until competitiveness is achieved or shown to be unachievable.
- If they overlap with carbon pricing systems, transitional incentives can drive down the carbon price and dis-incentivise other GHG reduction options such as coal to gas switching. Overlap should be avoided.

Contact James Primrose / Nick Wayth / Paul Jefferiss

The role of natural gas

Key messages

- Natural gas provides an **abundant and reliable source of energy**
- Gas is **the lowest carbon fossil fuel** and emits about 50% of the CO_2 of coal per unit of power. It is also **the cleanest burning fossil fuel** with significant air quality benefits relative to coal
- BP believes methane emissions from oil and gas developments **can be economically and technically controlled** to deliver significantly better lifecycle greenhouse gas benefits than coal.
- Gas is the **fastest growing fuel,** at c 2% p.a. with a growing LNG trade. It is also the most **flexible fossil fuel** supporting intermittent renewables
- **BP has a major and growing natural gas business.** BP projects that its gas production will be 60% of total production by the mid-2020s
- BP believes that governments should play a key role in **the development of infrastructure, access and markets for gas,** whilst recognising that there will be **regional differences** in policy frameworks.

Related briefs: Methane, Unconventionals and hydraulic fracturing, Climate change, Carbon capture and storage, Unburnable carbon

Additional information

BP's gas portfolio

- Upstream: Nine material gas value chains in Australia, Azerbaijan-Georgia-Turkey, Egypt, India, Indonesia, North Africa, Oman, Trinidad and, US Lower 48. Oman and Shah Deniz 2 are mega-projects currently under development. Mauritania and Senegal gives BP a leadership position in a huge low cost gas resource.
- IST: plans to grow its merchant LNG portfolio to support liquefaction capacity of ~25mtpa, providing portfolio flexibility and an enabler for Upstream gas projects
- BP's project development choices are driven by providing the best value for our shareholders. BP recognises the merits of gas but in order to invest, gas needs to compete with other portfolio options

Gas and policy

- BP believes that governments should play a key role in the development of infrastructure, access and markets for gas
  - Upstream: Frameworks for gas development projects vary regionally. Market pricing is encouraged in most cases. However, in some countries, government priorities and energy policies will have a key influencing role in the development of the country's gas resources. Governments should provide straightforward regulations and suitable fiscal terms to incentivise gas development

  - Midstream: Facilitation of infrastructure investment in LNG terminals and intra-regional pipelines, open access to infrastructure and well-designed markets.
  - Downstream: Remove subsidies for high carbon competitors to gas in power.
- To encourage gas project economics to compete with other energy investments governments should provide appropriate regional support. Options include: fiscal terms for unconventional gas, gas pipeline construction or funding, free access to pipelines and markets.
- A carbon price will help gas and other lower carbon options, but should not be set to incentivise gas or any other resource. The market should choose

Gas and the environment

- The air quality benefits of gas versus coal are often understated (SO_2, NOx, particulates)
- Increasing the share of gas in the energy mix is an important step in the orderly transition to a lower carbon economy
- Gas emits 50% of the greenhouse gases of coal per unit of electricity generated
- Whilst more data is needed to understand and control the impact of methane leakage, natural gas is better than coal in almost all cases
- Gas is needed as back up to support intermittent renewable sources e.g. wind, solar

Gas and energy access

- 18% of the global population, 1.3bn people, lack access to electricity
- Gas is immediately available at reasonable cost compared to renewables, and can be substituted into power with existing technology
- Gas is a feedstock for petrochemicals including fertilizer and methanol

Global gas growth

- Gas is the fastest growing fossil fuel with projected 1.6% per annum growth, accounting for 25% of energy consumption by 2035 – but growth is dependent on government policy
- Technology: Gas is a material feedstock for chemicals and is starting to displace liquids in transport in certain niches. However, it is not obvious that gas provides significant carbon emissions benefits over liquids in transportation
- Geography: China, India, and others face rapidly growing energy demand and are looking to diversify their sources of supply
- Gas projects can face difficulties which can only be solved by governments: insufficient state gas price to make the upstream economic, requirement to sell gas domestically, large unpaid government debts; and impractical fiscal or working environments for unconventionals

Contact Catherine Gillam \ Dominic Emery

Positions on issues that relate indirectly to climate change

The Arctic

Key messages

- The Arctic offers **significant opportunities** to help us meet **our growing energy needs**, but due to its unique nature and environment, it also carries specific challenges.
- BP has operated in the **US Arctic for several decades** and also has interests elsewhere including the Canadian Beaufort Sea.
- BP will share its **knowledge and experience in the Arctic with the operators we work with** to help deliver safe and responsible operations in this sensitive environment.
- We will continue to assess **other opportunities** in the Arctic, but only where we believe we understand and can manage associated risks.
- The Arctic - and the offshore Arctic in particular - has **specific challenges** that must be overcome to address issues such as appropriate oil spill response capability as well as economic operability. We invest in research and work with industry partners to **improve overall industry capability** in this area.

Related briefs: Climate change, Climate change adaptation, Sensitive and protected areas

Additional information

BP and the Arctic

- As of 2017, we operate 9 fields in Alaska's North Slope. We have some exploration licenses in Greenland and the Canadian Beaufort Sea but drilling has not yet begun.
- Apart from in Alaska, BP has a largely non-operated position in the Arctic. We seek to work with companies which we believe have proven Arctic capability.
- We have Group wide policies in place which cover risk management for operated assets and non-operated joint ventures.

BP and Rosneft

- Through our shareholding in Rosneft, we have an indirect interest in off-shore exploration licenses held by Rosneft in the Russian Arctic.
- BP does not directly partner with Rosneft on any of its off-shore Arctic licenses.
- In 2016, the Yermak Neftegaz JV was established between BP (49%) and Rosneft (51%) to conduct onshore exploration in the West Siberian and Yenisey-Khatanga basins.
- As a responsible shareholder, we will seek to support Rosneft in all its Arctic licenses, while complying with all applicable sanctions.

Oil spill response

- Safe operations are BP's priority – we only carry out operations where we believe we can do so in a safe, secure and responsible fashion.
- BP has participated in Arctic oil spill research and development for over 30 years

including several joint industry programmes, such as the International Association of Oil & Gas Producers' joint programme on Arctic Oil Spill Response Technology & Oil in Ice.

- All existing BP Arctic operations have government-approved specific response plans that recognize the risk of a spill and the sensitivity of the Arctic.
- BP is a member of Alaska Clean Seas and Norwegian Clean Seas Association for Operating Companies – spill response organisations with equipment and trained personnel to tackle oil spill incidents.

Developing Arctic capability

- BP is already working with others to deploy consistent safety standards and technologies. We are an active participant in ISO Arctic Standards as well as participating in industry groups including OGP and the Barents 2020 project.
- We intend to further develop existing Arctic technology to ensure there is the capability to enable safe operations.
- BP will continue to work to identify environmental impacts of our operations in the Arctic and seek to avoid or minimise them – as we do with all our operations.

Arctic communities

- BP recognises Arctic communities depend on the Arctic environment for subsistence needs, livelihoods and cultural heritage. We acknowledge the importance of respecting the unique cultures and ways of life in Arctic communities.
- We work with Arctic communities to understand and manage potential impacts from our work and our response plans are enhanced through considering local and traditional knowledge. We look for opportunities for communities to benefit from our long-term presence in regions.
- We have worked with the North Slope Borough and the Alaska Eskimo Whaling Commission in designing plans to mitigate potential impacts on subsistence whaling.

The Arctic and climate change

- We understand that the Arctic is a sensitive environment and that some studies have shown it is experiencing impacts from climate change.
- However, climate change remains a global issue requiring global action. Governments must act by setting a clear, stable and effective carbon policy framework. BP continues to take practical steps through, for example, investing in low carbon energy development and employing an internal carbon price.

Arctic regulatory framework and governance

- Governments set the legislative and regulatory frameworks concerning the Arctic. We are required to comply with such requirements where we do business and work to respond to the challenges that a potentially changing and evolving legal framework brings.
- BP considers the Arctic Council the primary intergovernmental forum for promoting cooperation, coordination and interaction among the Arctic States. It's important that industry has opportunities to engage and provide input and expertise.
- We recognise the role of the UN Convention on the Law of the Sea (UNCLOS) in providing an effective framework for the rights and responsibilities of nations' use of the world's oceans, and the role of the International Maritime Organisation (IMO) in governing shipping, transit and marine security issues.

Contact Kathrina Mannion

Canadian oil sands

Key messages

- Canada's oil sands have the **third-largest crude oil reserves** in the world, after Saudi Arabia and Venezuela. They continue to play an **important part in BP's strategy** to help meet global energy demands.
- BP recognizes that **greenhouse gas emissions, water and land impacts** are key environmental issues associated with developing oil sands.
- We are using our **technological capability** to manage these issues and **minimize impacts**, working with our **partners** and through industry associations, such as COSIA.
- Building relationships with **local and indigenous communities** is fundamental to the effective development of the oil sands resource.
- We **listen and respond to concerns** raised by local communities through regular face-to-face meetings and sponsoring and participating in community events. The regulator also requires a formal consultation process.
- We support **rigorous regulation and monitoring** of oil sands developments.

Related briefs: Climate change, Life cycle assessment, Water management

Additional information

BP's oil sands investments

- BP is involved in three oil sands lease areas in Alberta:
  1. Sunrise Energy Project, operated by Husky, began producing oil in March 2015.
  2. Pike Phase 1, operated by Devon, and is in the design stage.
  3. Terre de Grace, operated by BP, is currently under appraisal.
- BP's projects are among the 80% of Canada's oil sands that are too deep to be mined at the surface, so we will use steam assisted gravity drainage (SAGD) to soften and extract the bitumen. This has a smaller physical footprint than mining and plays to our subsurface strengths.

Commercial viability

- BP requires oil sands projects, like all of its investments, to be commercially viable over the life of the project. We expect the break-even price for oil sands to be within the range we require from other types of crude oil investments.
- Our objective is to build an integrated business that connects our upstream position in the oil sands with BP's downstream refining capacity in the US.

Greenhouse gas emissions

- Latest 'well-to-wheels' studies measuring GHG emissions from producing the oil (well) through to combustion (wheels) suggest that crude produced through SAGD technology is 7-17% more GHG intensive than average US refined crude.

- BP, along with many in situ oil sands operators, is looking at a variety of ways to extract the bitumen using less heat. This will permit recovery with lower energy intensity and therefore lower emissions.
- BP Canada has developed a carbon management and technology plan which helps to effectively manage GHG emissions. The plan:
  - Examines and quantifies potential regulatory scenarios.
  - Identifies direct and indirect GHG reduction options for the short, medium and long term.
  - Recommends actions required to protect the business value.

Other environmental issues

- Water use: We plan to obtain water for SAGD operations from non-freshwater sources, and any produced water not recycled will be disposed of via deep disposal wells.
- Water contamination: BP is supportive of government efforts to implement scientifically rigorous, comprehensive, integrated and transparent water monitoring.
- Land/Physical footprint: With our partners, we have identified several ways to minimize land disturbance, including using a constraints mapping approach. This looks to site project infrastructure based on understanding local sensitive environmental parameters and community views. We also have progressive reclamation plans for the appraisal well sites to minimize the overall footprint of a project.

Local communities

- We have developed a framework for offering local employment, training and contracting opportunities at our Terre de Grace development.
- We recognize that some local groups have expressed concern about the potential health impacts of oil sands development. We are supportive of the work the government is doing with aboriginal groups to evaluate health impacts.

Joint ventures

- Projects are managed through governance committees, with equal representation from BP and our partners, and approval rights laid out in joint venture agreements.
- The project operator is required to provide timely reporting on various financial, operational, environmental and safety metrics per regulatory requirements and joint venture agreement requirements.

Technology

- BP is working to advance technology in oil sands development and operations in four areas: appraisal, recovery, efficiency, and sustainability.
- Our efforts are both collaborative and distinctive and include: a heavy oil research facility at the University of Surrey in England, technology sharing agreements with oil sands partners, participating in a number of joint industry projects which support research and being a member of Canada's Oil Sands Innovation Alliance (COSIA).

Government regulation and oversight

- The oil sands are a strictly regulated resource. Provincial and federal regulatory agencies set out comprehensive and rigorous requirements for the full life cycle of developments, including an environmental impact assessment prior to development.
- BP supports government efforts to build upon existing monitoring capacity through the establishment of an independent monitoring agency. This will contribute to an improved understanding of the long-term cumulative effects of oil sands development.

Contact Anita Perry

Life cycle assessment (LCA)

Key messages

- BP believes LCA can inform high-level policy making and consumer choice – but **inherent uncertainties** in data quality and methodology mean it must always be used with care and should not be used as the basis for detailed policy or regulation.
- BP is concerned that some LCA studies used by policymakers in major markets do not fully account for these uncertainties and regulation based on them could have **unjustified and undesirable consequences for several important fuel products**, especially natural gas, oil sands, fossil transport fuels and biofuels. Low Carbon Fuel Standards (LCFS) are a particular concern.
- BP is concerned that LCA applied to global supply chains **could create regulation outside national boundaries.** This could lead either to trade disputes or to unintended consequences such as displacement of crude trade flows.

Related briefs: Canadian oil sands, Climate change, Low carbon fuel standards

Additional information

What is Life Cycle Assessment?

- Life cycle assessment (LCA) is an analytical tool used to assess the full environmental impacts of a product, process or service, including the greenhouse gas emissions of different fuels.

BP's view on appropriate use of LCA

LCA should not be used even for high level policy development without:

- A rigorous, comparable and appropriate methodology, clear definitions of the fuel pathway and validated data.
- An acknowledgement of inherent uncertainties in data and methodology.
- Recognition that the analysis may have unforeseen, unintended or perverse consequences that undermine policy or consumer objectives.
- A sensitivity analysis to ascertain whether conclusions and policy recommendations are significantly affected by uncertainties in the data or assumptions in methodology.
- Flexibility to deal with improved understanding over time.

Climate benefits of natural gas replacing coal

- The majority of academic and governmental LCA studies demonstrate that when used for power generation, the life cycle GHG emissions from natural gas are less than half of those from coal.
- Studies that deny any climate benefits from gas over coal make, what BP believes to be, unrepresentative or even extreme assumptions, for example using high estimates of:

- The amount of methane emissions from gas extraction operations.
- The relative contribution of methane to global warming compared to carbon dioxide.

Oil sands vs conventional crude

- BP acknowledges that the life cycle GHG intensity of products derived from oil sands is in a range 5-15% higher than that of products derived from average crudes in the US.
- The wide uncertainty range makes it difficult to draw firm conclusions, and is due to real uncertainty and variability, for example:
  - Lack of empirical data, especially related to flaring and venting.
  - Variability of emission intensity of crudes with different characteristics.
  - Variability in the production and processing of oil sands.
  - Numerous analytic methodologies, such as how to allocate emissions from refining to the wide range of refined products.
- We are working with our co-owners to reduce the GHG emissions from our planned oil sands projects.

Low carbon fuel standards (LCFSs)

We oppose LCFSs. Where they are implemented, we

- Do not support the differentiation of fossil fuels produced from different crudes for the following reasons:
  - Difficulty of obtaining and passing the required information reliably along the fuel supply chain to the obligated fuel supplier.
  - Unintended consequence of displacing crude feedstocks and/or products to unregulated jurisdictions, raising GHG emissions globally – crude "shuffling."
  - Trade implications of discriminating against feedstocks or products from outside the jurisdiction.
- We prefer to use fixed default values for the life cycle GHG emissions of all fuels (gasoline or diesel) independent of feedstock i.e. "crude is crude".

Biofuels and indirect land use change

- There is a concern that the use of land for biofuels requires the conversion of land elsewhere for food or feed. A full biofuels LCA would in theory include the GHG emissions associated with this indirect land use change (ILUC).
- We believe that modelling ILUC can be used to inform policy discussions, but numerical ILUC penalties should not be included in a stable policy framework due to:
  - Lack of evidence – with biofuels forming less than 2% of global crop area.
  - Inherent complexity and uncertainty in the operation and dynamics of the global economy in general and agricultural markets in particular, and in the science of emissions from changing land use.
  - Early stage of model and methodology development – with a wide range of results.
  - The most effective way to regulate land use and sustainability objectives is through direct land management and wider agriculture policy.

Contact Mike McMahon

Methane emissions from the oil and gas sector

Key messages

- BP recognizes the role that **methane plays in global warming,** and that the oil and gas sector is one source of methane emissions.
- Based on most of the recent methane emissions studies, power generation from **gas has lower GHG emissions than coal** and helps to mitigate climate change.
- BP believes methane emissions from oil and gas developments **can be economically and technically controlled** to deliver significantly better lifecycle greenhouse gas benefits than coal.
- We continue to take actions **to deepen our understanding** of our methane emissions and their sources and **to prevent or reduce methane emissions.**
- We **encourage further improvements in the accuracy of estimates** at both regional and global levels as we believe that some studies have overestimated methane emissions.

Related briefs: Climate change, Unconventional gas and hydraulic fracturing, Role of natural gas

Additional information

Methane emissions and climate change

- Although methane is emitted in much smaller quantities than CO_2, it is a more powerful GHG and has a disproportionally large, short term impact on global warming. According to the IPCC, methane is the second largest contributor to current warming, with almost 60% of the impact of carbon dioxide.
- Methane has a short atmospheric lifetime (around 10 - 12 years) and reductions in methane emissions will cause atmospheric concentrations (and methane induced warming) to drop quickly compared to CO_2.
- Gas has about 50% of the lifecycle GHG emissions of coal (per kWh of electricity generated) even if up to 3% of methane is emitted– this is based on comparing emissions over a 100 year time period which is the most relevant timescale to climate change. However, even on a shorter timescale (1 year or less) gas still has a climate advantage over coal provided methane emissions are less than 3%.

Methane from the oil & natural gas sector (production and the gas supply chain)

- The focus of this position is methane emissions from the oil and gas sector and does not include CO_2 from use of gas as fuel or flaring of gas.
- Global methane emissions are about half from natural sources (e.g. wetlands) and half from human sources. Of human methane emissions 23% are estimated from the oil and gas sector, 43% from agriculture and the remainder from other sectors.
- Global estimates of oil and gas methane emissions are about 4% of gas production, i.e. higher than the US where recent studies found it to be less than 3%.

- Recent studies by the Environmental Defense Fund and the US Environmental Protection Agency, found methane emissions to be lower than 3%. Estimates of methane emissions from oil and gas in the US vary widely depending on the study and methodology. This continues to cause uncertainty for policy makers and the Industry needs to better quantify methane emissions in order to improve the confidence in methane emission estimates from the sector.
- US measurement studies strongly indicate that a high proportion of methane emissions (70-80%) in the US are emitted by a small subset of facilities/equipment (10-20%). The identification of these sources and how to address them presents new challenges that industry is working to solve.
- Contrary to common misunderstanding, methane emissions occur from a variety of process, well work, pneumatic gas, storage tank and other sources. Only a small proportion of methane emissions come from equipment leaks.
- Natural gas value chains that include LNG operations generally have higher CO_2 emissions which make controlling methane emissions even more important.

BP's methane emissions

- L48 operations methane emissions were about 0.6% of gas production in 2014. This performance has been achieved through years of good practice and leadership on voluntary emission controls.
- Upstream is continuing a survey of methane sources in our non-US operations to deepen our understanding of our methane emissions.

Policy context

- Policy makers are focusing on methane reductions to limit near term warming and allow time for effective CO_2 policies to be put into place. CO_2 remains the predominant GHG in the longer term. Continued focus on both is critical to meet long term climate goals.
- **US**: The Administration has announced plans for actions to cut methane emissions from the oil and gas sector by 40-45% from 2012 levels by 2025 as part of the US commitment for the Paris 2015 climate summit. To help meet this commitment:
  - The EPA plans to initiate rulemaking, aimed at methane emissions reduction from new or modified oil and gas sources, by summer 2015 and finalize these rules in 2016. The EPA is also working on voluntary and regulatory approaches to address methane emissions from existing operations.
  - The Bureau of Land Management plans to update their standards regarding venting, flaring, and leaks on federal leases to reduce methane emissions from both new and existing operations in roughly the same time frame as the EPA rules.
- **EU:** The European Commission has proposed revisions to the National Emission Ceilings Directive (NECD) to include methane. The target proposed is for a 33% reduction in methane emissions by 2030 emissions versus 2005 levels. If confirmed, the NECD places an obligation on each EU Member State to meet a specific ceiling or target reduction on top of implementing existing and planned legislation.
- **Global:** In 2015 BP joined the Climate and Clean Air Coalition (CCAC) Oil & Gas Methane Partnership (OGMP) aimed at reducing methane emissions from the oil and gas sector and endorsed the World Bank Zero Routine Flaring by 2030 Initiative. Both seek to reduce GHG emissions and contribute to improved energy use. BP is a member of the Oil and Gas Climate Initiative (OGCI). One of the OGCI focus areas is the role of gas which includes understanding methane emissions and ways to reduce methane emissions.

Contact: Liz Rogers

Sensitive and protected areas

Key messages

- BP supports the **need to conserve sensitive areas** that house the rich natural and cultural heritage of our planet.
- BP believes that it is for **governments to decide** if such areas should be protected or developed and on the level and type of protection. We recognize that **some areas may be considered too sensitive** for oil and gas activities.
- Our decision to operate in a sensitive area is made on a **case by case** basis, based on our robust operating practices and risk assessments.
- Through these practices we work to **avoid** and, if required, **minimize and mitigate** potential impacts in all our operations and projects:
  - All new projects determine whether their planned activities could affect the most sensitive protected areas; International Protected Areas (IPAs).
  - If project planned activities could affect an IPA, the segment chief executive decides whether to grant or refuse permission for the project to proceed. This is informed by a detailed risk and impact assessment.
  - Since the update to our requirements in 2006, no major operated project has sought permission to enter an IPA. There are historical pipeline operations in World Heritage sites but no exploration activities.
- BP actively **works with UNEP-WCMC** to improve the quality of sensitive and protected area information, **and engages with industry associations, local communities and other NGOs** to understand their views and the risks to BP.
- We regularly review BP activities in or near protected areas and disclose where BP is operating in relation to IPAs in our sustainability report.

Related briefs: Water management, Marine spatial planning (MSP), Sustainable Development Goals (SDGs)

Additional information

Sensitive and protected areas

- Sensitive areas possess natural or cultural features of national, regional or international importance and governments may identify and designate some areas as protected.
- Stakeholder concerns continue to grow on the degradation of sensitive areas from climate change, habitat loss and over-exploitation of resources. Due to these concerns, the Convention of Biological Diversity has set targets to protect 17% of land and 10% of seas by 2020. As a result, there has been a significant increase in the number of protected areas globally, as well as increasing use of marine spatial planning as a tool to protect the marine environment in a more integrated way.

Oil and gas industry and protected areas

- Several NGOs and indigenous peoples' groups believe that continued oil and gas exploration in protected areas, particularly World Heritage sites, should not be allowed (i.e. 'no-go'). Some NGOs have also begun to use the unburnable carbon debate to argue that oil and gas extraction is not justified in highly sensitive areas.
- Significant stakeholder concerns from oil and gas activities in sensitive areas include potential impacts from oil spills and the opening up of new areas for development.
- Some BP investors have also raised concerns regarding reputational and financial risks of working in protected areas and encourage greater disclosure and no-go commitments to World Heritage sites.
- In response to specific stakeholder concerns, Shell, Total and Tullow Oil have made commitments not to explore for oil and gas inside natural World Heritage sites.

BP's approach to sensitive and protected areas

- Our OMS requirements mandate that our new projects and existing operations identify environmental sensitive areas to understand and manage potential impacts and risks. BP does not declare no-go into protected areas.
- BP has identified a set of the most sensitive protected areas as International Protected Areas (IPAs) which include World Heritage sites, Ramsar wetland sites, certain regional and national protected areas and certain important areas for indigenous peoples.
- New major projects undergo a robust screening process. Planned project activities that could affect an IPA must undertake a detailed risk and impact assessment. This informs a decision by the segment executive to grant or refuse permission to proceed.

BP activities and protected areas (as of January 2016)

- Since 2006, no new BP operated project has sought permission to enter an IPA and we have no activities inside World Heritage sites, other than existing pipelines.
- Only two currently planned projects are located near an IPA: Shallow Water Absheron Peninsula project is planning to conduct 3D seismic near the Absheron National Park, Azerbaijan; and the WREP refurbishment project in Georgia is planning to work next to the Tbilisi National Park and in the buffer zone of the Mtskheta World Heritage Site.
- Two major projects have activities inside other protected areas: Quad 204 (North Sea) inside Faroe Shetland Sponge Belt Marine Protected Area and planned exploration drilling in the Great Australian Bight (GAB) Commonwealth Marine Reserve - this project is subject to NGO campaigns targeting shareholders raising concerns over BP activities.
- Ten operations have activities inside protected areas (including seven in IPAs): five major operating sites (Lower 48, Trinidad, North Sea, Gelsenkirchen, AGT); BP shipping; Antwerp lubricant plant; Hamble & Frontignon terminals; and the Edom Hill windfarm.

Working with stakeholders

- We regularly engage international NGOs on matters relating to protected areas to understand their concerns and to share our approach to managing impacts.
- We work in partnership with UNEP-World Conservation Monitoring Centre (UNEP-WCMC) to improve access to data on protected areas and work with industry associations IPIECA & IOGP to develop industry-wide guidance.

Contact Liz Rogers / Paul Jefferiss

Unconventionals and hydraulic fracturing

Key messages

- Hydraulic fracturing, combined with more recent advances in horizontal drilling technology, **has unlocked significant amounts of unconventional oil and gas** that otherwise would not be accessible.
- **Unconventional resources can be developed safely and responsibly.** BP has over 60 years of experience as a responsible operator in this field.
- BP acknowledges there are concerns about hydraulic fracturing, including potential water contamination, earthquakes, and disruption to communities. BP manages impacts by using proven practices and industry standards:
  - **Water:** BP wells and facilities are designed, constructed, operated and decommissioned to mitigate the risk of natural gas, oil and hydraulic fracturing fluids contaminating water resources.
  - **Earthquakes:** Hydraulic fracturing creates very small earth tremors that are rarely felt at the surface. Before conducting work in areas prone to small earth tremors, BP assesses the potential risks from our operations to inform our plans.
  - **Local Communities**: We proactively engage with local communities and members of the public who may be impacted by our operations to understand and respond to their concerns.
- We **support regulation of unconventional resource development** based on an understanding of local conditions and best applied industry practices.

Related briefs: Canadian oil sands, Methane, Role of natural gas, Water

Additional information

Unconventionals and hydraulic fracturing

- This position paper covers unconventional gas and oil found in shale and tight sand formations, as well as coal bed methane, developed through hydraulic fracturing.
- Unconventional resources are situated in rocks with extremely low permeability, making extraction more difficult. Industry uses hydraulic fracturing to develop these resources.
- Hydraulic fracturing is the process of pumping water, mixed with a very small proportion of sand and chemicals, underground at a high enough pressure to create and maintain small cracks in the rock. These cracks help release hydrocarbons that would otherwise not be accessible.
- Globally, the US Department of Energy estimates technically recoverable resources of 7,300 trillion cubic feet of shale gas and 345 billion barrels of shale and tight oil, much of which can be produced through hydraulic fracturing.

BP and unconventionals

- BP's unconventional development activity is largely in the US where we are the 8th largest gas producer and 80% of our onshore gas is from unconventional resources.
- Our US Lower 48 onshore business began operating as a separate business, with its own governance, processes and systems in 2015. Its approach is to operate in line with

industry standards developed in the context of the highly regulated US environment.

- BP is evaluating unconventional resource opportunities in other countries. In Oman, BP operates and holds 60% of the Khazzan project, which is developing tight gas reserves utilizing hydraulic fracturing technology. Production start-up is targeted for late 2017.

Protecting water resources

- A June 2015 draft assessment from the US Environmental Protection Agency, described as 'the most complete compilation of scientific data to date' on the potential impact of hydraulic fracturing on drinking water, did not find evidence that hydraulic fracturing has led to widespread, systemic impacts on US drinking water resources.
- Thousands of feet of solid rock typically separate usable underground water sources from the deeper locations where hydraulic fracturing activity takes place. We install multiple layers of steel in the well and cement these through and below the base of usable water sources to isolate them from hydrocarbons and hydraulic fracturing fluids.
- We line reserve pits and evaporation ponds with impermeable clay and/or heavy-duty polyethylene liners to contain wastewater. Waste is then characterized and either treated and recycled, or disposed at authorized facilities.
- We are trialling a number of water-saving technologies to reduce the amount of fresh water used in our operations, including treatment and reuse options.
- BP supports transparency regarding ingredients used in hydraulic fracturing. In the US we disclose the ingredients used in our fracturing fluid on the FracFocus.org website or other state-designated websites.

Greenhouse gas and air emissions

- Unconventional resources are routinely developed within the same range of GHG emissions as other oil and gas resources.
- In the US we utilize reduced emission completion techniques, sometimes referred to as "green completions", at the majority of our gas operations to manage methane and CO_2 emissions during flow-back and well clean-up.

Earthquakes or seismic activity (induced seismicity)

- Hydraulic fracturing creates very small earth tremors that are rarely felt at the surface. The underground injection of wastewater, such as for the disposal of water produced from oil and gas reservoirs, may also pose a risk of inducing seismic activity in some areas, but very few events have been documented relative to the large number of disposal wells in operation.

Engaging with communities and reducing our physical footprint

- We place a priority on open and active dialogue with community members and local leaders where we operate. For example, in Colorado we have a Community Advisory Panel that meets monthly at our facilities to learn about our operations and activity.
- We work to minimize the surface footprint of operations, through horizontal drilling, optimising wells on a single well site and using planting techniques to help restore the land after construction.

Hydraulic fracturing offshore

- Industry, including BP, has used hydraulic fracturing offshore for decades, primarily to enhance performance in conventional formations.
- In the Gulf of Mexico, where there has been recent stakeholder interest in offshore fracturing, the majority of hydraulic fracturing is implemented through a completion technique known as "frac-pack". This is a different technique than is typically used in unconventional formations and uses much smaller volumes of fracturing fluid.

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