advancing low carbon

case studies 2020
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As we reimagine energy, we’re finding ways to reduce emissions in our own operations, improve our products, and invest in new low carbon businesses, products and services.

To encourage every part of BP to pursue these low carbon activities, our Advancing Low Carbon (ALC) accreditation programme recognizes some of the efforts that can help BP and the world get to net zero. This year we are delighted to accredit or reaccredit 76 activities that support our low carbon ambition and aims. These activities represent the diversity of our businesses and include everything from our advanced fuels and lubricants to lower carbon products, and from global research initiatives to our work with start-ups developing innovative new technologies.

To be accredited, each activity must meet the specified criteria and requirements and will have been independently assured by our assurance partner, Deloitte LLP.

In all, we estimate that 64 million tonnes of CO₂ equivalent have been saved or offset through activities delivered by BP, and 5.4 million tonnes through activities delivered by BP partners since the programme began in 2017.*

But we’re not stopping here. As we reimagine energy, our people will continue to work to find new, lower carbon ways of working towards net zero. Our Advancing Low Carbon programme is one way of showing you how and encouraging everyone at BP to participate.

* The total emissions saved or offset from the accredited activities are estimated using a variety of methodologies and baselines. The figures aim only to illustrate the impact of the activities within the programme, and delivered by BP or a BP partner only refers to the organization leading on delivering the activity. Savings or offsets may be claimed by or attributed to other parties. The scope of accredited activities is wider than, and does not seek to align with, our greenhouse gas reporting boundaries. Therefore, the figures are not directly comparable to BP’s reported emissions.
Reducing emissions

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Green completions at Khazzan

BP Oman has successfully tested a zero flaring process called a ‘green completion’ to reduce greenhouse gas emissions during well tests.

Well test operations at BP Oman’s Khazzan gas field account for 65% of the Oman business’s greenhouse gas (GHG) emissions. The tight reservoirs in Oman means hydraulic fracturing is needed to unlock the hydrocarbon to commercial levels. Once the ‘frac’ is complete, wells are tested and cleaned up before they can be put on production. Typically this is done by flowing gas through well test equipment and the hydrocarbons are flared to the atmosphere. BP Oman drills and tests around 25 new wells at Khazzan every year.

A trial of a zero flaring process called ‘green completions’ during well test operations has significantly reduced GHG emissions versus a standard test. The process works by routing hydrocarbons from the well test equipment (where it has been “cleaned up” to production specifications) to pipelines to the processing facility and then exporting it, avoiding the need to flare. BP used its experience of green completions at gas facilities in the US and adapted the technique to suit the specific requirements of Khazzan’s wells.

GHG saved
82,000 tonnes CO₂e [Jan – Dec 2019]
Sustainable emissions reductions
BP is taking steps to tackle emissions across its operations through delivering sustainable emissions reductions.

Greenhouse gas (GHG) emissions occur as part of the day-to-day running of our facilities around the world – from our offshore platforms to our retail sites. BP is taking steps to tackle those emissions by finding and acting upon opportunities to make what we call “sustainable emissions reductions.”

We encourage employees to identify, implement and report on actions or operational changes that lead to permanent emissions reductions. For example, this might include steps we are taking to reduce the amount of energy we use at a particular site or replacing older equipment with new, more efficient technology. We have a well-established methodology and process for reporting these reductions.

In 2019, a number of sustainable emissions reductions were made across our businesses. Examples include:

- In Angola we delivered further reductions in flaring emissions in 2019 by building on process optimizations in 2018 and implementing well management strategies.
- In Oman we invested in performance improvements to our power generators, which allowed us to operate with a reduced number of gas turbines.
- At our BP Whiting refinery in the US, the installation of a new control scheme on a flare system has reduced continuous natural gas purging.
- Our onshore BPX Energy sites executed various projects to reduce methane venting from equipment and fugitive emissions, with the additional implementation of compressor optimization initiatives, which reduced fuel consumption on site.

GHG saved
1,200,000 tonnes CO₂e (BP-operated) and 300,000 tonnes CO₂e (3rd party operated) [Jan – Dec 2019]

* Sustainable emissions reductions (SERs) result from BP actions or interventions that have led to ongoing reductions in Scope 1 (direct) and/or Scope 2 (indirect) GHG emissions (carbon dioxide and methane) such that GHG emissions would have been higher in the reporting year if the intervention had not taken place. SERs must meet three criteria: BP made a specific intervention that has reduced GHG emissions, BP must be able to quantify the reduction and the reduction is expected to be ongoing. Reductions are reportable for a 12-month period from the start of the intervention/action.
Producing less carbon than competitor or industry benchmarks

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BP Chargemaster

BP has more than 7,500 charging points for electric vehicles across the UK, following its acquisition of Chargemaster in 2018.

According to BP’s 2019 Energy Outlook report there could be more than 350 million electric vehicles (EV) on the roads around the world by 2040.

The development of convenient and innovative EV charging technologies and networks to support this growth is part of BP’s strategy to advance the energy transition. Through BP Chargemaster we have more than 7,500 charging points across the UK. Combining our complementary expertise, experience and assets marks an important step towards offering our customers access to fast and ultra-fast charging at our service stations.

All of the electricity that BP Chargemaster’s network of charging points uses is certified as renewable through the redemption or purchase of Renewable Energy Guarantees of Origin (REGOs) by independent energy supplier Ovo and Orsted. In 2019, BP Chargemaster has supplied around 13 million kWh of certified renewable electricity to customers, powering more than 53 million miles of travel and avoiding more than 15,000 tonnes of carbon dioxide.

GHG saved

15,000 tonnes CO₂e [Jan – Dec 2019]

Where in the world

UK

More information

External website

Information on methodology and/or basis for this activity
BP fuels with ACTIVE technology

BP is developing and deploying advanced fuels that contain its ACTIVE technology formula designed to improve vehicle efficiency. This helps reduce fuel consumption, which, in turn, helps to lower CO₂ emissions.

The amount of CO₂ a vehicle emits is affected by how efficiently it runs. Greater efficiency helps to reduce fuel consumption, which, in turn, helps to lower CO₂ emissions.

Diesel vehicles lose efficiency when harmful deposits build up on important engine parts, such as fuel injectors, so their efficiency can be improved by removing these deposits. In gasoline vehicles, efficiency can be improved by reducing the amount of energy lost due to friction in the engine.

BP produces advanced gasoline and diesel fuels that contain our innovative ACTIVE technology formula designed to address these issues and help improve vehicle efficiency.

In 2019, millions of customers in 17 countries around the world used BP fuels with ACTIVE technology in their vehicles.

GHG saved
1,500,000 tonnes CO₂e [Jan – Dec 2019]
BP Sustainable Aviation Fuel
BP’s sustainable aviation fuel made from used cooking oil.

Air BP supplies 6.6 billion gallons of aviation fuel a year and is committed to helping its customers and partners meet the International Air Transport Association’s target of cutting net carbon dioxide emissions in half by 2050, relative to 2005 levels. For example, we supply sustainable aviation fuel (SAF), called BP Biojet, to customers in Norway, Sweden, France, Germany and the US.

Since 2016, we have supplied SAF across Norway and Sweden, beginning at Oslo airport in Norway, which was the first airport in the world to use an existing hydrant fuelling system to handle SAF. This BP SAF is currently made using recycled cooking oil, which is blended with fossil jet fuel, and then certified as Jet A-1 under ASTM D7566 Annex 2 HEFA-SPK.

We also supply Bromma, Arlanda, Halmstad and Kalmar airports in Sweden and various airlines on an ad-hoc basis at a number of other airports across Scandinavia. In the US, BP SAF has been used at Chicago O’Hare, one of the busiest airports in the world, and by Airbus at its facility in Mobile, Alabama. In Germany BP SAF is used by Airbus to fuel their Beluga XL freight aircraft. The BP SAF supplied in 2019 reduced GHG emissions by more than 80% compared to conventional jet fuel.

GHG saved
4,200 tonnes CO₂e [Jan – Dec 2019]
Butamax® advanced biofuels

Working in partnership with DuPont, BP has developed Butamax® technology, which converts sugars from corn into an energy-rich bio-product known as bio-isobutanol.

Biofuels can play an important role in reducing greenhouse gas emissions (GHG). To support this, BP, in partnership with DuPont, has developed Butamax® technology to convert sugars from corn into an energy-rich bio-product known as bio-isobutanol.

Bio-isobutanol has a wide variety of applications. For example, it can be used in the production of paints, coatings and lubricant components. It can also be blended with gasoline at higher concentrations than ethanol, and can be transported through existing fuel pipelines and infrastructure.

In 2017, Butamax® acquired Nesika Energy LLC and its state-of-the-art ethanol facility in Kansas which Butamax® is now upgrading to produce bio-isobutanol.

GHG saved 17,000 tonnes CO₂e [Jan – Dec 2019]
Carbonfree Chemicals

BP has invested in Carbonfree Chemicals, a US based company, which has developed technology that converts GHG emissions from flue gases into chemicals that can then be used to make products such as baking soda.

BP has invested in Carbonfree Chemicals, a company that has developed new technology to convert greenhouse gas emissions from flue gases into chemicals. These can then be used to make a variety of products, such as baking soda and household bleach.

Based in San Antonio, Texas, Carbonfree Chemicals currently captures CO₂ that would otherwise be emitted from the adjacent coal-fired Capitol Aggregates cement plant. At full capacity, the plant is projected to directly capture 75,000 tonnes of CO₂. It will avoid a total of almost 205,000 tonnes of CO₂ emissions every year by shipping the carbon-negative chemicals to market and displacing other carbon-intensive products.

Carbonfree’s SkyMine® process needs 30% less energy to remove CO₂ versus the more common amine-based CO₂ capture technology.* The process also removes mercury, metals, sulphur dioxide, nitrogen oxides and particulates – and returns clean air and clean water.

GHG saved

| 6,100 tonnes CO₂e | Jan – Dec 2019 |

* http://www.carbonfreechem.com/
Castrol low viscosity lubricants
Castrol provides low viscosity engine lubricants for passenger cars which reduce fuel consumption, leading to lower carbon dioxide emissions.

Working with leading car manufacturers we have carried out extensive research and development to create a portfolio of Castrol low viscosity lubricants for passenger cars that still retain top class protection for the engine.

Our low viscosity lubricants help reduce friction and subsequent energy losses to improve the fuel efficiency of passenger cars leading to CO₂ emissions savings, based on a reduction in the amount of fuel used.

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Energy-efficient LNG tankers

We have introduced a fleet of liquefied natural gas (LNG) carriers that are the most fuel efficient and technologically advanced vessels ever built for BP.

To support BP’s strategy to grow our gas portfolio, BP Shipping has introduced a new fleet of liquefied natural gas (LNG) ships, the most fuel-efficient and technically advanced LNG tankers ever built for BP. They will help us to respond to growing demand for gas in both established markets, such as India, China and the US, and new markets, such as Pakistan, Jordan and Bangladesh.

The ships are fitted with ‘slow speed’ tri-fuel engines, which can use compressed ‘boil-off’ gas from the cargo tanks as fuel. Boil off is the liquid LNG changing state to gas due to slight temperature rise during transportation which can then be used to power the engine. This technologically advanced engine is one of the most efficient engines available on the market and will significantly reduce carbon dioxide, nitrogen oxide, sulphur dioxide and particulate emissions generated by the new BP LNG ships compared to the older ships in the BP operated fleet in normal operating conditions. The vessels are also fitted with compressors as part of the fuel system, that can also be used to run a reliquification plant, condensing and saving gas that would otherwise have to be flared.

GHG saved
190,000 tonnes CO₂e [Jan – Dec 2019]
Energy-efficient oil tankers

BP operates a fleet of 26 oil tankers which are more energy efficient than required under the International Maritime Organization’s Energy Efficiency Design Index (EEDI) regulations.

Maritime transport plays a vital role in global economic development and prosperity, with roughly 90% of world trade carried by sea. According to the International Maritime Organization, the shipping sector contributes around 2% of global carbon dioxide emissions and, therefore, has a role to play in reducing global emissions.

Over the past few years, BP Shipping has introduced 26 new oil tankers, the energy efficiency of which goes beyond the Energy Efficiency Design Index (EEDI) requirements set by current International Maritime Organization (IMO) regulations.

All these new oil tankers feature innovations in propulsion, such as an optimized hull form and super long stroke ‘G-type’ electronic engines. They can also be programmed electronically to a desired speed and power depending on operational requirements. As a result, the new ships already meet the levels of energy efficiency specified under the IMO’s EEDI requirements for ships that are built after 2020.

These innovations significantly reduce the amount of fuel the new vessels need and so lower their greenhouse gas emissions, when compared to the ships that they have replaced in the BP Shipping fleet.

GHG saved
21,000 tonnes CO₂e [Jan – Dec 2019]
PTAir™ Low Carbon

PTAir™ Low Carbon offers customers in the polyester value chain the opportunity to purchase lower carbon feedstock.

Purified terephthalic acid (PTA) is a raw material used in making high-performance multi-purpose plastics for packaging, clothing and industrial fibre products. The largest application for PTA is in manufacturing polyethylene terephthalate (PET) for the polyester industry to produce plastic bottles, textiles, film and moulded product applications.

PTAir™ Low Carbon offers customers in the polyester value chain the opportunity to purchase lower carbon feedstock. Its use of proprietary PX and PTA technology supports a 29% lower global warming potential than the average European PTA production.* This has been assured by ERM Certification and Verification Services (ERM CVS). BP customers can also go further in advancing their low carbon objectives by accessing the additional benefits of PTAir™ Neutral and PTAir™ Neutral Products.

PTAir™ Low Carbon is available today from BP’s Geel manufacturing facilities in Belgium.

GHG saved

21,000 tonnes CO₂e [Jan – Dec 2019]

* Based on an independent cradle-to-gate Eco-profile by IFEU Heidelberg (IFEU), reviewed by ERM Certification and Verification Services (ERM CVS). The study conducted by IFEU uses Plastics Europe Methodology to compare the environmental impact of 1 Kg of BP Geel PTA manufactured with BP integrated PX (integrated production) to PTA produced in Europe as published in the Environmental Product Declaration of the PET Manufacturers in Europe February 2016. The study is in accordance to ISO 14044 requirements. The reference year for the data used in the compared studies is 2013. The IFEU study follows a mass balance approach based on proportion of integrated PX versus total consumption. The full assurance opinion of ERM CVS can be found on the “external website” link on the left.
Providing renewable energy

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Biofuels

BP’s biofuels business in Brazil converts sugarcane into ethanol for use as a fuel for transport. Ethanol reduces GHG emissions by up to 70%, compared with conventional transport fuels.

Biofuels can play an important role in reducing greenhouse gas (GHG) emissions. BP has manufactured biofuels since 2008 and was the first international oil and gas company to invest in Brazilian sugarcane ethanol. In 2019, we operated three ethanol production plants, producing some 788 million litres of ethanol equivalent per year and our ethanol production avoided GHG emissions equal to over 330,000 fewer European cars on the road in a year.

Sugarcane is currently one of the most efficient raw materials used in biofuels production. Ethanol, its derivative, has lifecycle GHG emissions around 70% lower when compared with conventional transport fuels. BP also makes biopower by burning bagasse, the fibre that remains after crushing sugarcane stalks. Some of this power runs our biofuels mills in Brazil, with the remaining 70% exported to the local electricity grid.

In 2019, BP agreed to form a 50:50 joint venture with Bunge, to create BP Bunge Bioenergia, a leading bioenergy company in one of the world’s largest fast-growing markets for biofuels. BP’s interest in the new venture grows its existing biofuels business by more than 50%.

GHG saved

720,000 tonnes CO₂e [Jan – Nov 2019]
Biopower

BP creates biopower by burning bagasse, the fibre that remains after crushing sugarcane stalks. Some of the power runs our three biofuels mills in Brazil, with the rest exported to the local electricity grid.

BP has manufactured biofuels since 2008 and was the first international oil and gas company to invest in Brazilian sugarcane ethanol. We also create biopower by burning bagasse, the fibre that remains after crushing sugarcane stalks to make these biofuels. In 2019, BP produced around 890 gigawatt hours (GWh) of electricity – this would be enough to supply power to 1.4 million people in Brazil. The power produced was enough to supply all three of our mills, with the remaining 70% exported to the local electricity grid. This is a low carbon power source, with part of the CO₂ emitted from burning the bagasse offset by the CO₂ that is absorbed by sugarcane when it is growing.

GHG saved

Included in the Biofuels figure (estimated to account for 22% of the savings).
Cherry Point renewable diesel

BP’s Cherry Point refinery manufactures lower carbon diesel made from biomass-based feedstocks, alongside traditional fossil fuel feedstocks.

Since 2018, Cherry Point has manufactured diesel made from biomass-based feedstocks. This was done by processing these renewable* feedstocks alongside traditional fossil fuel feedstocks to produce diesel. The result is a product with the same properties as conventional ultra-low sulphur diesel, but with a lower carbon footprint, compared with the petroleum-based alternative.

Producing renewable diesel in this way helps reduce the carbon footprint of Cherry Point’s diesel versus conventional fossil fuel diesel, verified through the California LCFS lifecycle analysis.

GHG saved
340,000 tonnes CO₂e [Jan – Dec 2019]

*As meets the definition of ‘Renewable Hydrocarbon Diesel’ as defined in California Low Carbon Fuel Standard (17 CA ADC § 95481(a)(123)). “Renewable Hydrocarbon Diesel” means a diesel fuel that is produced from non-petroleum renewable resources but is not a mono-alkyl ester and which is registered as a motor vehicle fuel or fuel additive under 40 Code of Federal Regulations part 79. This includes the renewable portion of a diesel fuel derived from co-processing biomass with a petroleum feedstock.
Co-processing of bio-feedstocks at Castellon refinery

BP’s refinery in Spain now manufactures fuels with a lower carbon footprint by co-processing vegetable oil with crude oil feedstock.

BP’s refinery in Castellon, Spain, manufactures diesel using a process known as bio co-processing. It works by processing certified sustainable bio-feedstocks, alongside traditional fossil fuel feedstocks to produce diesel.

The result is a product with the same properties as conventional ultra-low sulphur diesel, and with a lower carbon footprint compared to fossil diesel.

Extensive technical work has been done to expand options to increase co-processing rates from 2016 to 2019.

Castellon was the first refinery in BP to be certified by the International Sustainability & Carbon Certification (ISCC) organization for sustainable feedstocks.

GHG saved
670,000 tonnes CO₂e [Jan – Dec 2019]
Co-processing of bio-feedstocks at Lingen refinery

BP’s refinery in Germany now manufactures fuels with a lower carbon footprint by co-processing vegetable oil with fossil crude oil.

BP’s refinery in Lingen, Germany, manufactures renewable diesel using a process known as bio co-processing. It works by processing certified sustainable bio-feedstocks with fossil fuel feedstocks to produce high quality fuel with a lower carbon footprint. Lingen was the first refinery in Germany to produce renewable diesel and has been certified by the International Sustainability & Carbon Certification (ISCC) organisation for sustainable feedstocks.

GHG saved

18,000 tonnes CO₂e [Jan – Dec 2019]
Co-processing of bio-feedstocks at Rotterdam refinery

BP’s refinery in the Netherlands now manufactures fuels with a lower carbon footprint by co-processing vegetable oil with fossil fuel feedstocks.

BP’s refinery in Rotterdam, the Netherlands, uses a process known as bio co-processing to make high quality ultra-low sulphur diesel. It works by processing certified sustainable bio-feedstocks with fossil fuel feedstocks to produce a high quality fuel with a lower carbon footprint.

The result is a product with the same properties as conventional ultra-low sulphur diesel, and with a lower carbon footprint compared to fossil diesel.

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<td><strong>63,000 tonnes CO₂e</strong> [Jan – Dec 2019]</td>
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Information on methodology and/or basis for this activity
Lightsource BP

Lightsource BP focuses on funding, developing and managing major solar projects and smart energy solutions around the world.

In 2019 BP increased its stake in Lightsource BP, to create a 50:50 joint venture. This comes two years after BP first announced it was acquiring 43% of Lightsource BP. The deal gives Lightsource BP access to new funding to help accelerate its global growth.

Since the partnership began, the company’s activities have expanded from 5 to 13 countries and it has been awarded significant corporate power contracts in the US and Australia, entered the Egyptian energy market through a joint venture, and together with Everstone, established EverSource Capital to manage the Green Growth Equity Fund aiming to raise up to $700 million of investment in low carbon energy infrastructure projects across India.

BP brings its relationships to the partnership, opening doors and sharing its knowledge of operating in territories across the world. Lightsource, formed in 2010, brings a track record in the funding, development and long-term operation of utility-scale solar, alongside an innovative perspective on individual project and portfolio financing.

GHG saved

72,000 tonnes CO₂e [Jan – Dec 2019]
ONXY InSight

ONXY InSight is a joint venture between Castrol and Romax Technology that provides engineering and software services to wind farm operators so that they can monitor the condition of their turbines and avoid breakdowns.

Wind energy plays an increasingly important role in the provision of electricity. This rapid growth is expected to continue over the next two decades as costs fall and the efficiency and performance of turbine technology increases. However, the industry faces a challenge: how to improve long-term availability by reducing unplanned turbine downtime.

Castrol’s joint venture with Romax Technology, ONXY InSight, combines deep understanding of wind turbine technology with innovative software and data analytics, to provide engineering and software services to wind farm operators so that they can monitor the condition of wind turbines and avoid breakdowns.

Our joint venture works with wind operators across Europe, North America and Asia and currently provides services to around 40GW of wind turbines – enough to power more than 25 million homes in the UK.

GHG saved

110,000 tonnes CO₂e [Jan – Dec 2019]
**Wind energy**

BP Wind Energy North America Inc. (through its subsidiaries) holds interests in 10 onshore wind energy sites in the US with a gross generating capacity of approximately 1,700 megawatts.

As wind turbine technology continues to evolve and improve, wind sites using new generation technology can produce more electricity at an ever-decreasing cost.

BP Wind Energy's subsidiaries operate nine wind farms in six states - Colorado, Idaho, Indiana, Kansas, Pennsylvania, and South Dakota - and own an interest in a tenth wind farm in Hawaii. Of the nine operated sites, BP’s subsidiaries hold a 50% equity interest in six of them and 100% ownership on the remaining three. We hold a 50% equity interest in the non-operated site.

BP’s wind farms have a gross generating capacity of approximately 1,700 megawatts. That’s enough electricity to power all the homes in a city the size of Dallas, and it makes BP one of America’s top 20 wind energy producers.

Our largest wind facility is the Flat Ridge 2 farm in south-central Kansas, which can generate enough electricity to power twice the number of homes in the state capital of Topeka.

**GHG saved**

- **2,800,000 tonnes CO₂e** (BP operated)
- **65,000 tonnes CO₂e** (3rd party operated) [Jan – Dec 2019]
Offsetting carbon produced

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Air BP into-plane fuelling services

Air BP’s programme to maintain carbon neutrality for our global into-plane fuelling service across Air BP operated locations.

In October 2016, Air BP became the first aviation fuel supplier to achieve carbon neutrality for its global into-plane fuelling operations. The greenhouse gas (GHG) emissions are quantified starting from the point at which fuel is delivered to onsite airport storage facilities, through to the sale of fuel ‘at the aircraft wing tip’. Carbon credits are purchased to offset those emissions and the programme is verified by an independent certifier.

Air BP aims to retain its carbon neutral status and has a 10-year carbon reduction plan, first introduced in 2016. This targets a 5% carbon intensity reduction in GHG emissions over 10 years against a 2016 baseline period related to its operations using a range of initiatives. For example:

- improved efficiency using vehicle technologies such as start/stop mechanisms
- vehicle fleet upgrades to improve engine efficiency and reduce diesel consumption
- variable-speed electric drives for fuel pumps, which help match electricity usage with fuel flow

Any residual emissions are offset through our carbon offsetting programme, BP Target Neutral (BPTN), on an annual basis.

GHG offset

16,000 tonnes CO₂e [July 2018 – Jun 2019]
**BP and Aral fuel cards (fleet)**

BP and Aral offer business customers the opportunity to offset the carbon emissions from the fuel they purchase through our fuel card, as well as accessing training and data to improve their own fuel efficiency.

BP and Aral are making carbon neutral driving easier for companies via our smart business fuel card and carbon management programme. Together they help fleet customers:

- access software that collects and analyses data from the fuel card to show individual vehicle greenhouse gas (GHG) emissions performance
- provide online training to improve fleet driver skills and fuel efficiency
- automatically offset remaining fleet GHG emissions to achieve ‘Carbon Neutral Fleet’ status.

The emissions are offset through BP Target Neutral, our carbon offsetting programme that helps support emission reduction projects around the world, such as forest conservation in Zambia and renewable energy in China, through the purchasing of carbon credits.

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**GHG offset**

110,000 tonnes CO₂e [Jan – Dec 2019]

Offset through BP Target Neutral programme
Castrol carbon neutral passenger car oils

The passenger car oils that Castrol sells in Japan have been certified carbon neutral since 2018 in accordance with the BSI PAS 2060 standard.

In Japan, Castrol has certified a wide range of its car engine oil and engine shampoo ranges sold through independent car workshops and retail outlets as carbon neutral. It is certified carbon neutral in accordance with the BSI PAS 2060 standard and Castrol has made a commitment to reduce the carbon footprint of its product range over time.

Residual emissions are offset through BP Target Neutral, our carbon offsetting programme that helps support emission reduction projects around the world, such as forest conservation in Zambia and renewable energy in China, through the purchasing of carbon credits. These projects also help provide economic, social and environmental benefits in their local communities.

GHG offset

26,000 tonnes CO₂e [Feb 2019 – Jan 2020]
Castrol Optigear Synthetic

Castrol is the world’s first supplier to offer the wind industry certified carbon-neutral lubricants in accordance with the BSI PAS 2060 standard.

Wind energy plays an important role in reducing greenhouse gas emissions. And lubricant technology can help to make sure that today’s wind turbines run reliably and efficiently.

Castrol has more than 30 years’ experience of working with the wind industry and today supplies lubricants to thousands of wind turbines. In 2017 it became the first lubricant supplier in the world to offer the wind industry certified carbon neutral lubricants. Optigear Synthetic CT 320 and Optigear Synthetic X 320 are both certified as carbon neutral throughout their life cycle, in accordance with the BSI PAS 2060 standard. This includes their production, transportation and eventual disposal at the end of their service life.

To achieve carbon neutral status, we calculate the products’ carbon footprint, develop a carbon reduction plan and offset residual emissions through BP Target Neutral, our carbon offsetting programme that helps support emission reduction projects around the world, such as forest conservation in Zambia and renewable energy in China, through the purchasing of carbon credits. These projects also help provide economic, social and environmental benefits to their local communities.

GHG offset
17,000 tonnes CO₂e [April 2018 – Mar 2019]
Castrol Professional

Castrol’s high-performance engine oil is the world’s first certified carbon neutral engine oil in accordance with the BSI PAS 2060 standard.

Castrol Professional is a high performance engine oil range and in 2015 it became the world’s first certified carbon neutral engine oil. It is certified carbon neutral in accordance with the BSI PAS 2060 standard. Castrol assessed the greenhouse gas (GHG) footprint of the Professional range against criteria set by Greenhouse Gas Protocol, an organization that supplies the world’s most widely used GHG accounting standards. Castrol also made a commitment to reduce emissions throughout the product’s life cycle, including the emissions associated with its production, packaging and distribution.

We then offset the residual emissions through BP Target Neutral, our carbon offsetting programme that helps support emission reduction projects around the world, such as forest conservation in Zambia and renewable energy in China, through the purchasing of carbon credits.

GHG offset

360,000 tonnes CO₂e [Apr 2018 – Mar 2019]
Castrol Transmax

In Japan, Castrol’s transmission fluids, Transmax ATF Professional FE and CVT Professional have been certified as carbon neutral in accordance with the BSI PAS 2060 standard.

In Japan, Castrol TRANSMAX ATF Professional FE and TRANSMAX CVT Professional are both certified carbon neutral in accordance with the BSI PAS 2060 standard.

Castrol TRANSMAX ATF Professional FE and CVT Professional are transmission fluids used to lubricate the automatic gearboxes in passenger vehicles. Castrol TRANSMAX with Smooth Drive Technology™ automatically adjusts its friction level in response to changing pressures on critical transmission parts, thereby enabling longer transmission life.

We calculated the carbon footprint, developed carbon reduction plans and offset the residual emissions through BP Target Neutral, our carbon offsetting programme that helps support emission reduction projects around the world, such as forest conservation in Zambia and renewable energy in China, through the purchasing of carbon credits. These projects also help provide economic, social and environmental benefits in their local communities.

GHG offset

7,800 tonnes CO₂e [Oct 2018 – Sep 2019]
Castrol VECTON

Castrol VECTON was the world’s first certified carbon neutral commercial vehicle engine oil in accordance with the BSI PAS 2060 standard and is specifically formulated to meet the needs of the commercial vehicle industry.

Castrol VECTON provides a range of lubricants specifically formulated to meet the needs of the commercial trucking industry. It helps fleet owners improve fuel efficiency and, in 2016, it became the world’s first certified carbon neutral commercial vehicle engine oil. Castrol assessed the greenhouse gas (GHG) footprint of VECTON against criteria set by Greenhouse Gas Protocol, an organization that supplies the world’s most widely used GHG accounting standards. It also made a commitment to reduce emissions throughout the product’s life cycle, including those associated with production, packaging and distribution. We offset residual emissions through BP Target Neutral, our carbon offsetting programme.

GHG offset

180,000 tonnes CO₂e [Dec 2018 – Nov 2019]
PTAir™ Neutral

PTAir™ Neutral is the world’s first certified carbon neutral PTA, giving BP customers the opportunity to purchase a carbon neutral product with net zero carbon emissions.

Purified terephthalic acid (PTA) is a raw material used in making high-performance multi-purpose plastics for packaging, clothing, and industrial fibre products. The largest application for PTA is in manufacturing polyethylene terephthalate (PET) for the polyester industry to produce plastic bottles, textiles, film and moulded product applications.

BP produces lower carbon PTA called PTAir™ Low Carbon for customers in the polyester supply chain and has also launched PTAir™ Neutral, the world’s first certified carbon neutral PTA.* PTAir™ Neutral offers customers the opportunity to purchase a carbon neutral product with net zero carbon emissions.

Carbon neutrality is accomplished through BP Target Neutral, our carbon offsetting programme that helps support emission reduction projects around the world, such as forest conservation in Zambia and renewable energy in China, through the purchasing of carbon credits.

GHG offset

13,000 tonnes CO₂e [May 2018 – Apr 2019]

* PTAir™ Neutral became a carbon neutral product in 2017 in Europe, Asia and the USA. GHG emissions are offset using credits obtained by BP Target Neutral. GHG emissions are calculated by determining the cradle to gate emissions associated with PTAir™ Neutral branded products that are produced and sold from BP’s manufacturing facilities in Belgium, China and the USA. PTAir™ Neutral is certified to the BSI PAS 2060 standard for defined periods and assured by DEKRA Assurance Services.
Furthering research and technology to advance low carbon

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Accredited activities that fall within this criterion include those that advance low carbon through investing in new lower carbon technologies, supporting independent research or helping the industry to take action on low carbon through partnerships or established programmes. Each activity must demonstrate BP’s clear support and involvement either financially or with support in kind. No quantitative data is required to accredit this activity, although it can be submitted if relevant.
Belmont Technology Inc.

BP has invested in Belmont Technology Inc., a US-based company, which is developing a system that uses machine learning to accelerate the calculations needed to create subsurface simulations.

BP has invested in Belmont Technology Inc., a US-based company that is developing a system that uses machine learning to accelerate the calculations needed to create subsurface simulations and enable better informed business decisions. BP is trialing Belmont’s AI technology that can run real-time simulations in a matter of seconds, rather than hours or days. It can also be used on energy efficient devices such as standard laptops, tablets or smartphones. Typically BP uses its High Performance Computing Centre to perform these kinds of simulations, which requires significant amounts of power. Belmont Technology’s system has the potential to significantly reduce the amount of energy BP needs to run its simulations.
BP and DiDi fast charging network in China

BP has partnered with ride hailing company DiDi to develop a nationwide network of electric vehicle charging hubs across China.

BP has partnered with DiDi, the world’s largest ride hailer, to develop a nationwide network of electric vehicle (EV) charging hubs across China – the world’s largest market for EVs. DiDi’s digital platform already has approximately 550 million ride hailing users and around 1 million EVs registered on it. More EVs on the roads can help to reduce greenhouse gas emissions and particulate emissions in cities.* In May 2019, BP opened its first pilot charging site in the southern city of Guangzhou and in August 2019, BP and DiDi signed a Joint Venture Agreement governing the further development of a national network of EV charging hubs. The JV became live in January 2020.

BP and Johnson Matthey’s Fischer Tropsch technology

BP and Johnson Matthey have developed advanced chemical conversion technology which enables the economic conversion of household waste and biomass into lower carbon jet fuel and diesel.

BP and Johnson Matthey have worked together to improve chemical conversion technology called Fischer Tropsch. The chemical process behind this technology has been around for 100 years and BP has been working on it for almost 30. By redesigning the reactors and changing the catalyst recipe, BP and Johnson Matthey have been able to reduce the technology’s cost while improving its productivity.

Fischer Tropsch can be used in a variety of applications. For example, it can be used to economically convert waste and biomass into diesel and jet fuel, helping to reduce the carbon intensity of air transportation fuels by around 80%.*

It can also be applied to gas flares, capturing energy that would otherwise be wasted, helping to reduce atmospheric GHG emissions. BP and Johnson Matthey are now exploring ways to integrate Fischer Tropsch with water electrolysis and carbon capture to generate circular, carbon neutral hydrocarbon fuels.

* Please refer to the Fulcrum BioEnergy case study
**BP and Tesla energy storage for wind**

Working with Tesla, BP is piloting a high-performance energy storage project at its Titan 1 wind farm in the US. The technology stores excess energy for use across the site when the wind isn’t blowing.

BP Wind Energy is piloting a high-performance energy storage project using a battery supplied and fitted by Tesla at its Titan 1 wind site in South Dakota.

The technology has been integrated with the wind site and is designed to store excess energy. This stored power can then be used across the site where needed when the wind isn’t blowing. This will reduce the need for grid-supplied power in order to run the turbines.

The pilot project is the first of its kind in BP’s wind business and could improve performance and reliability. It will also help us to make better-informed decisions about similar energy storage projects across our entire portfolio.
BP Biosciences Center

BP’s Biosciences Center conducts cross-disciplinary research and development to help the organization find technology solutions to solve complex business challenges.

BP’s Biosciences Center (BSC) studies ways in which bioscience can create technology solutions to solve complex business challenges. The BSC’s cross-disciplinary team of scientists support many aspects of BP’s operations and several early stage projects are looking at ways to support a renewable, sustainable, and circular economy.

For example, the BSC is investigating the biological production of a renewable polymer which has better properties than petroleum-based plastics. It also provides technical support for other BP businesses, such as Butamax® advanced biofuels and Brazil Biofuels. The BSC is helping Castrol explore ways to make high performance lubricant base oil, greases and electric vehicle fleet fluids using biological feedstocks and processes. And it is evaluating different bio-based products for use in oil and gas wells.
BP participation in Climate and Clean Air Coalition

BP is a member of the Climate & Clean Air Coalition (CCAC) which aims to deepen industry’s understanding of the core sources of methane emissions in upstream operations so that it can take action to address them.

Methane is the primary component of natural gas, and, while short-lived in the atmosphere, it is understood to be much more potent as a warming agent, compared to carbon dioxide.

BP is committed to taking a leading role in addressing the methane challenge and is taking action to reduce methane emissions – in its own operations and in collaboration with its peers and others.

For example, we participate in the Oil and Gas Methane Partnership (OGMP) – part of the Climate & Clean Air Coalition (CCAC), which includes governments, businesses, scientific institutions and civil society.

The OGMP is helping the industry better understand the core sources of methane emissions in upstream operations so that it can take action to address them. It provides companies with a credible mechanism to systematically and responsibly tackle their methane emissions.

BP contributes to the Partnership’s work by participating in technical working groups and surveying our own operations for these core sources and reporting on our progress in tackling methane emissions across our relevant assets.
BP participation in the CO₂ Capture Project

BP is a founding member of the CO₂ Capture Project, formed with other energy companies in 2000. Participants have carried out more than 150 projects to improve understanding of carbon capture, use and storage.

Carbon capture, use and storage (CCUS) technology offers one important way in which existing power infrastructure and energy-intensive industries that rely on the use of fossil fuels can reduce greenhouse gas emissions.

BP is a founding member of the CO₂ Capture Project (CCP). Formed in 2000, CCP members have since taken part in more than 150 projects to increase our understanding of the science, engineering, application and economics of CCUS. These projects have been conducted in partnership with research institutions, universities, industry and government organizations – including the US Department of Energy and the European Commission.

Now in its fourth phase, the project (CCP4) aims to increase our understanding of existing, emerging, and breakthrough CO₂ capture technologies when applied in oil and gas scenarios and to demonstrate that geological storage is safe, measurable and verifiable. For example, this includes the performance and cost evaluation of CO₂ capture technologies, large rock mass experimentation and best practice for transitioning from CO₂ enhanced oil recovery to CO₂ storage.
BP participation in the Methane Guiding Principles

BP is a signatory of the Methane Guiding Principles that were drawn up by a coalition of industry peers, international institutions, non-governmental organizations and academics to develop best practices on methane emissions reductions.

Methane is the primary component of natural gas, and, while short-lived in the atmosphere, it is understood to be much more potent as a warming agent, compared to carbon dioxide.

A concerted industry response is needed to increase focus on the reduction of methane emissions and BP was one of the first companies to sign up to a set of principles focused on reducing methane emissions across the natural gas value chain.

Developed in collaboration with industry peers, international institutions, non-governmental organizations and academics, the Methane Guiding Principles provide priority areas for action along the natural gas value chain, from production to the final consumer. They both complement and reinforce other industry initiatives, such as the Oil and Gas Climate Initiative and the Climate and Clean Air Coalition’s Oil and Gas Methane Partnership.

Each signatory is committed to undertake the principles and implement them by way of a defined action plan. A concerted industry response is needed to increase focus on the reduction of methane emissions. Therefore, signatories will encourage other companies to apply these principles.

The Guiding Principles are:
- Continually reduce methane emissions
- Advance strong performance across gas value chains
- Improve accuracy of methane emissions data
- Advocate sound policy and regulations on methane emissions
- Increase transparency.
BP participation in the Oil and Gas Climate Initiative (OGCI)

BP is one of the founding members of the voluntary, CEO-led Oil and Gas Climate Initiative, which aims to increase the ambition, speed and scale of activities by its individual companies to help reduce manmade GHG emissions.

BP was one of the founding members of the voluntary, CEO-led Oil and Gas Climate Initiative (OGCI), which aims to increase the ambition, speed and scale of activities carried out by its individual companies to help reduce manmade greenhouse gas emissions. Launched in 2014, OGCI is currently made up of 13 oil and gas companies that pool expert knowledge and collaborate on action to reduce these emissions.

A key focus for OGCI in 2019 has been carbon capture, use and storage (CCUS). OGCI launched CCUS KickStarter in 2019, a major new initiative designed to facilitate large-scale commercial investment in CCUS, by enabling multiple low-carbon industrial hubs. These hubs will capture carbon dioxide from several industrial sources within one region and bring economies of scale by sharing transport and storage infrastructure. They also provide opportunities to use carbon dioxide in products.

There was a 9% reduction in OGCI member companies’ aggregate upstream methane emissions in 2018, pushing the collective methane intensity of the 13 OGCI member companies to 0.29% from a 2017 baseline of 0.32%. OGCI is continuing to work to push the intensity below 0.25% by 2025, with the ambition to achieve 0.20%.

OGCI is now working on a target to reduce by 2025 the collective average carbon intensity of our aggregated upstream oil and gas emissions, in support of the Paris Agreement.

OGCI’s investment arm – called OGCI Climate Investments and with a $1+ billion fund – also supports the development, use and scale-up of low emissions technologies and business models.
BP participation in World Bank flaring reduction initiatives

BP participates in the Global Gas Flaring Reduction Partnership and World Bank Zero Routine Flaring by 2030, which aims to eliminate routine flaring and to remove technical and regulatory barriers to progress.

During oil production, associated gas is sometimes flared for technical, regulatory or economic reasons. Gas flaring at oil production sites globally is estimated to cause more than 350 million tonnes of carbon dioxide emissions per year.*

The World Bank Group has initiated two key climate collaborations that bring together international and national oil companies, national and regional governments and international institutions. BP contributes to both initiatives, with the provision of funding and technical expertise.

BP was a founding member of the Global Gas Flaring Reduction Partnership (GGFR), which works to increase the use of natural gas associated with oil production by helping to remove technical and regulatory barriers to flaring reduction. We contribute to research, sharing of best practice and developing country-specific gas flaring reduction programmes at our facilities. Our work with Azerbaijan’s national oil company SOCAR was recognized with a GGFR Excellence award.

The ‘Zero Routine Flaring by 2030’ initiative brings together stakeholders who recognize that the current level of routine flaring is unsustainable from a resource management and environmental perspective. The group has also agreed to work together to eliminate routine flaring from operated oil assets by 2030. We are participating in this effort and report our progress to the World Bank each year.

BP sponsorship of Princeton Carbon Mitigation Initiative

Princeton’s Carbon Mitigation Initiative brings together scientists, engineers and policy experts to design carbon mitigation strategies that are safe, effective and affordable.

The Carbon Mitigation Initiative (CMI), based at Princeton University, is an independent academic research program investigating the dual challenge of the energy transition with a focus on scientific understanding of climate change and low carbon technologies for adaptation and mitigation. CMI currently includes 17 lead faculty principal investigators (PIs) and over 60 research staff and students producing over 850 peer-reviewed articles in highly respected journals.

Current work being explored at CMI includes:

- Projecting the infrastructure required for the United States to achieve net zero carbon by 2050
- Improving our understanding on how soil absorbs carbon
- Methane sinks and modelling
- Ocean heat uptake and acidification
- Climate change impacts on precipitation and tropical cyclones
- Low carbon concrete alternatives.

CMI is committed to sharing its research findings for the benefit of the larger scientific community, governments, industry and the general public.

The long-term nature of BP’s collaboration with CMI means we are better informed about the latest research and science. For example, it has improved our understanding of the role methane plays in climate change. The CMI methane project, initiated in spring 2017, consists of three interconnected sub-projects: an experimental project dealing with the critical issue of methane releases from wetlands, and two modelling projects aimed at quantifying the sources, sinks, and variations of methane in the atmosphere and on land.
BP sponsorship of the Harvard Kennedy School Energy and Climate Policy Programme

BP sponsors the Energy and Climate Policy Programme at Harvard Kennedy School, which is looking at policy options under the Paris Agreement for climate change mitigation, adaptation, finance and energy technology.

BP supports independent academic programmes that further study into ways in which issues such as policy, technology and resource management can help to advance a low carbon future. For example, the Energy and Climate Policy Programme at Harvard Kennedy School, US, carries out research and analysis on climate policy, as well as wider aspects of global environmental quality and natural resource management.

The programme is looking at policy options that relate to climate change mitigation, adaptation, finance and energy technology. For example, the programme:

- considers the effect of carbon pricing and the role of a US carbon tax and sectoral regulatory policies
- examines the challenge of decarbonizing China’s energy systems, including reforming China’s electricity system, and increasing Chinese investments in renewable energy both within and outside China
- assesses policies for energy technology innovation in India and China
- evaluates the implementation of the Paris Agreement and countries’ progress toward meeting the less-than-2-degree target
- assesses the global future of electric vehicles, with a specific focus on China and the United States
- studies the effects of climate change in the Arctic and how climate change in the Arctic impacts the rest of the world – including accelerated permafrost melt.
BP sponsorship of Tufts University Climate Policy Lab

The Climate Policy Lab at the Fletcher School at Tufts University explores which climate policies work and why – providing independent advice to governments as they implement policies in response to the Paris Agreement on climate change.

BP sponsors the Climate Policy Lab (CPL) at Tufts’ Fletcher School, US, which seeks to understand which energy and climate policies work, which don’t and why. The CPL is a source of independent and objective advice for governments as they implement domestic policies in response to the Paris Agreement on climate change. Since its inception in 2016, the CPL has expanded its portfolio of partners and projects, deepened its engagement with policymakers internationally and extended its geographic scope.

The CPL research is focused on a number of themes including climate policy design and implementation; carbon pricing; clean energy innovation; mobilisation of green finance as well as energy innovation in China, India and Ethiopia.
BP sponsorship of University of Texas Gulf Coast Carbon Center

BP supports the Gulf Coast Carbon Center (GCCC) which works to further understanding of the practical and cost-effective ways to plan, operate, monitor and close carbon capture, use and storage projects.

Carbon capture, use, and storage (CCUS) has a vital role to play in helping to meet the objectives of the Paris Agreement. It can achieve deep emissions reductions in existing power infrastructure and energy-intensive industries that rely on the use of fossil fuels.

But it requires collaboration to become a reality, which is why BP sponsors the Gulf Coast Carbon Center (GCCC) at the University of Texas’s Bureau of Economic Geology.

For two decades, the GCCC has sought to further academic and industry understanding of the practical and cost-effective ways to plan, operate, monitor and close CCUS projects. Its research studies the technology, engineering, stakeholder relations, policy, and economics needed to make it a widely deployable option.

The GCCC does this by:

- conducting model, lab and field studies to understand and validate geological storage of CO₂ in the deep subsurface
- evaluating technologies that monitor CO₂ in geological structures and recommending strategies that minimise the risk of release
- educating and engaging with stakeholders and communities about the benefits, safety, and risks
- helping the private sector to contribute to an economically viable CO₂ storage industry.
Castrol EDGE BIO-SYNTHETIC and MAGNATEC BIO-SYNTHETIC

BP has launched two Castrol lubricants made with 25% sugarcane-derived oil and is working with its supplier to explore options to increase the renewable content.

In 2017, BP launched Castrol EDGE BIO-SYNTHETIC, followed, a year later, by the launch of Castrol MAGNATEC BIO-SYNTHETIC. Both lubricants are made with 25% sugarcane-derived oil and have been validated using industry-approved tests. They also meet US government bio-based product criteria and have been certified as carbon neutral to the BSI PAS 2060 standard.

Now, Castrol is working with its supplier to explore the possibility of incorporating new high-quality plant-based oils to drive up performance, renewable content and drive down carbon footprint. It is early days, but the next generation base oil could have the potential to further reduce the products’ carbon intensity while improving performance.
Castrol GTX ECO

Castrol GTX ECO uses a base-oil blend made of at least 50% re-refined oil with the potential to reduce the product’s carbon footprint.

Castrol has developed GTX ECO products that use an innovative base oil blend that is made of at least 50% re-refined oil with the remainder from virgin oil to create a product with a lower carbon footprint.

To make Castrol GTX ECO, used oil is put through a rigorous re-refining process until it is as good as new. Castrol GTX technology is then added to fortify the oil creating a high-performance product that can help to extend engine life with a lower carbon footprint.

In November 2018, Castrol launched a GTX ECO formulation, made with 100% re-refined oil, into the US market. This includes sales to one of the most important independent workshop chains in the US which has chosen to use Castrol GTX ECO as its primary oil in its stores and workshops.

In 2020, Castrol plans to launch a new GTX ECO product to be sold by independent workshops across Europe.
C-Capture
BP has invested in C-Capture, a UK based company that has developed proprietary amine-free, solvent-based technology with the potential to remove carbon dioxide from large-scale industrial processes.

BP has invested in C-Capture, a company that has developed proprietary, amine-free, solvents with the potential to remove carbon dioxide (CO₂) from large-scale industrial processes. Removing CO₂ using amine-free solvents is less energy intensive than more traditional amine-based processes. These solvents are also less corrosive, meaning a wider range of construction materials can be used in industrial facilities.

C-Capture’s technology has the potential to remove CO₂ from almost any gas stream and could be used in anything from power generation to energy intensive industrial processes, such as the production of cement, iron and hydrogen. It could also be applied in the process of upgrading natural gas and biogas. C-Capture is now conducting a first-of-its-kind demonstration project at the biomass-powered Drax power station in Yorkshire, UK. It hopes to reach full scale deployment by the mid-2020s.
Energy-efficient process for acetic anhydride

BP has developed a unique method of making the chemical acetic anhydride that requires less energy than traditional methods.

Acetic anhydride is a chemical used in the production of cellulose acetate which can in turn be made into textile fibres and plastics, film and coatings. In addition, acetic anhydride is used in pharmaceuticals and the production of a bleach activator in laundry detergent. Acetic anhydride can also be used in a process called wood acetylation to improve the durability of wood and wood materials. For example, it will be used in the manufacture of acetylated Tricoya® wood chips to produce high performance MDF or particle board panels.

There are two main ways to make acetic anhydride: the ketene process and the carbonylation process. The older ketene route involves heating the acetic acid feedstock in a specialized furnace with a catalyst that is then further reacted with acetic acid to make acetic anhydride. Carbonylation using the Cativa process developed by BP requires less energy than the ketene process. This is because it does not need heat to react carbon monoxide with methyl acetate to create acetic anhydride. BP produces acetic anhydride at its plant in Hull, UK, using this more energy-efficient carbonylation process.
Fast digital imaging (FDI) for underwater inspection

BP has pioneered the new technology – fast digital imaging – in the North Sea, Trinidad and Tobago and Azerbaijan to help reduce the amount of time and carbon emissions associated with inspections at its subsea facilities.

BP has been using a new technology known as fast digital imaging (FDI) in the North Sea, Trinidad and Tobago and Azerbaijan to help reduce the inspection time on its subsea facilities. These inspections are currently conducted using a remote operating vehicle (ROV) and typically require a survey vessel out on location for around 30 days at a time. However, FDI uses ROVs equipped with laser and high definition cameras – instead of video – to capture ultra-high-resolution photos and laser measurements. The use of FDI at several BP facilities has reduced the time it takes to conduct the ROV work by an average of 68%. This, in turn, has reduced the amount of diesel needed and the associated CO₂ emissions. The technology is becoming the preferred methodology for BP.
Furthering research and technology to advance low carbon

FreeWire
BP has invested in FreeWire, a US based company, which makes ultra-fast electric vehicle charging technology.

According to BP’s 2019 Energy Outlook report there could be some 350 million electric vehicles (EV) on the road by 2040.

BP is exploring opportunities to support this growth in demand for EVs. We have invested in FreeWire Technologies, which makes ultra-fast EV charging technology.

Installing fixed fast-charging stations is typically expensive and labour intensive. It also requires substantial upgrades to support the connection between the charging stations and the main electricity grid. FreeWire, however, has developed a cost-effective fast charging system for use at fuelling stations which uses a low voltage electricity grid connection combined with energy storage and advanced electronics. FreeWire’s system can be deployed quickly, can easily be relocated and protects site hosts from high operational costs from demand charges. This will help BP to respond quickly to the growing demand for EVs and provide fast-charging facilities at forecourts where we see the greatest demand, without a significant upfront investment.

We are currently piloting FreeWire charging points at some of our retail sites in California.
Fulcrum BioEnergy, Inc.
BP has invested in Fulcrum BioEnergy, a US based company, which has developed a process to turn certain types of household waste into fuel for transport.

The international aviation industry has set itself tough targets to reduce its CO₂ emissions* and as a company that supplies 6.6 billion gallons of aviation fuel a year, BP is committed to helping our customers reach those goals.

We have invested in a company called Fulcrum BioEnergy, which has developed a process to turn certain types of household waste, such as paper, textiles, wood, plastics and food products, into transport fuels, such as synthetic jet fuel. Proprietary catalyst gas-to-liquids technology licensed by BP and our partner Johnson Matthey plays a key role in this process.

Transportation fuels produced this way can have around 80% fewer lifecycle greenhouse gas emissions† than traditional transportation fuels. As well as diverting waste from landfill, Fulcrum also recovers recyclable materials, displacing the production of new metals and plastics. The process also produces ash that can be used in cement kilns.

The first Fulcrum facility is currently being constructed in Nevada and the company has announced a second facility to be built in Indiana. The Nevada plant is expected to convert around 175,000 tonnes of household waste into approximately 11 million gallons of fuel every year.

* https://www.iata.org/policy/environment/Pages/climate-change.aspx
† http://fulcrum-bioenergy.com/
Green hydrogen for fuel production at Lingen refinery

BP’s refinery in Germany has become the first in the world to use hydrogen made from wind energy sources in its fuel production facilities.

A 30-day demonstration project at BP’s refinery in Lingen, Germany, has successfully used ‘green’ hydrogen made from water electrolysis. Refineries typically use hydrogen to remove sulphur from fuels, but since most of it is made from fossil fuels, it comes with significant associated CO₂ emissions.

During the trial, the Lingen refinery used 130,000 cubic metres of green hydrogen made by Audi Industriegas GmbH in Werlte. Lingen was the first in the world to demonstrate the use of green hydrogen in fuels production and shows that refineries can produce energy with fewer emissions.

BP is actively evaluating a number of options at some of its refineries to replace current hydrogen production with green hydrogen, which will help to lower the carbon footprint of our refineries and products.

Electrolysis technology has been available for many years, however falling costs have prompted renewed interest. The process – just one technology option for hydrogen production – uses renewable power to split water from hydrogen. When burned, hydrogen only produces water, meaning it could one day help to decarbonize major industrial sectors, such as heavy industry and transport.
Grid Edge

Grid Edge’s predictive energy management technology enables buildings to adapt energy demand and generation like a giant battery, reducing costs and carbon emissions.

BP has invested in Grid Edge, a UK based artificial intelligence technology company that has developed software that helps predict, control and optimize a building’s energy needs more efficiently.

The cloud-based predictive energy management system uses data, such as weather forecasts and expected occupancy, to anticipate a building’s energy demand. It then allows customers to adapt their use by making the most of periods of high renewable power generation and using the building’s flexibility in energy demand and generation like a giant battery.

This flexibility helps reduce energy costs and can lower carbon dioxide emissions by 10-15% and the technology offers significant benefits to airports, shopping centres and business districts.
Lightning Systems

BP has invested in Lightning Systems, a US based research and manufacturing company, which makes electric powertrains for trucks, vans and buses.

According to BP’s 2019 Energy Outlook report there could be 350 million electric vehicles (EV) on the road by 2040. We have invested in Lightning Systems, a US-based research and manufacturing company that makes electric powertrains for trucks, vans and buses.

Lightning Systems works with commercial fleets of trucks and buses to replace the power train of new or existing vehicles, converting them from diesel or gasoline to an entirely battery electric vehicle (BEV). Since the original body remains in use, it’s a little like recycling the entire bus or truck. This makes battery electric vehicles available to fleet companies using their preferred, familiar platforms, with readily available servicing and parts. Lightning System’s powertrains provide a reduction in tailpipe emissions helping to prevent carbon dioxide from entering the atmosphere.
Methane monitoring at Khazzan

BP Oman has tested monitoring technologies to better understand how much methane escapes from its production facilities at the Khazzan gas field.

BP believes that natural gas can play an important role in tomorrow’s lower carbon energy system. Natural gas is mainly methane and if the methane escapes into the atmosphere unburnt, it can be a potent greenhouse gas.

Methane accounted for 14% of all greenhouse gas (GHG) emissions at BP Oman’s Khazzan gas field in 2018. BP has tested three monitoring technologies to help it better understand how methane is escaping from its production facilities and how efficiently its flares burn the GHG:

1. drones equipped with advanced on-board sensors developed by NASA that capture live methane emissions data
2. gas cloud imaging that provides constant site monitoring
3. video imaging spectral radiometry flare monitors that use infrared images to measure how efficiently a flare consumes emissions.

BP is using the results of these trials to inform its methane monitoring plans at other gas facilities around the world.
NEXCEL

BP has developed a new oil management system called Nexcel that makes changing engine oil simpler and quicker, while reducing tailpipe CO₂ emissions.

BP has developed a new process that makes changing engine oil simpler, quicker, and cleaner while also reducing tailpipe carbon dioxide (CO₂) emissions.

The Nexcel oil cell is an easy-to-change unit containing both engine oil and filter. The 'plug-and-play' oil cell easily slots in and out, meaning that oil and filter are changed in one quick, clean step that takes around 90 seconds to complete. Once used, the oil cell is collected and both oil and cell can be re-used, creating a circular lifecycle.

Nexcel will be first used in the US grass-cutting industry, where there is potential to fit the cell into more than one million vehicles every year. That means the potential to reuse more than five million litres of oil each year.

BP is aiming to apply Nexcel to passenger cars by 2025, where the combination of thermal management and radical oil formulations can potentially reduce the tailpipe CO₂ emissions.
Peloton Technology

BP has invested in Peloton Technology, a US based connected and automated vehicle technology company, which has developed a wireless system that allows freight trucks to safely travel closely together to reduce aerodynamic drag and fuel consumption.

BP has invested in Peloton Technology, a connected and automated vehicle technology company that has developed a system that allows freight trucks to safely travel closely together to reduce emissions.

Peloton’s PlatoonPro links pairs of freight trucks together using wireless vehicle-to-vehicle communications to coordinate braking and acceleration and link active truck safety systems. This means that they can travel within less than 20 metres of each other while reducing aerodynamic drag – an energy-saving technique inspired by the close formations that cyclists and race cars use.*

Travelling in this way can result in an overall approximate fuel savings of 4% for the lead truck and 10% for the follow truck. This has been independently verified by NAFCE. Improvements in fuel efficiency can help reduce carbon emissions and other air pollutants such as volatile organic compounds, nitrogen oxide, and other particulate matter expelled through the combustion of diesel fuel.

Understanding this connected vehicle technology helps us all prepare for the future of autonomous vehicles and learn how professional drivers can work with the best technology to enhance safety, efficiency and productivity.

PowerShare
BP has invested in PowerShare, one of China’s leading electric vehicle charging platforms, which uses smart technology to streamline the entire charging process.

BP has invested in PowerShare, one of China’s leading integrated hardware and software solutions providers for electric vehicles (EV). PowerShare’s online platform connects EV drivers, charge point operators and power suppliers to help streamline the entire charging process – from locating a charge point to paying for the power supply. The cloud-based solution also helps power suppliers optimize their operations by continuously monitoring and balancing the power demand from vehicles with the grid’s supply capacity. PowerShare’s operated charging electricity capacity is around 244 million kWh.
SaaBre™ process for acetic acid

BP is developing a way of making acetic acid that has the potential to lower production-associated carbon emissions.

Acetic acid is used to make a variety of products, such as paints, adhesives and solvents. It is also used to produce purified terephthalic acid (PTA), found in polyester.

BP has developed a method of turning synthesis gas – a mix of hydrogen and carbon monoxide (CO) produced from natural gas – into acetic acid. This process, named BP’s SaaBre™ technology, avoids the costly process of purifying CO or the need to buy methanol needed by conventional plants.

BP first announced the SaaBre™ technology and pilot plant operations in Hull, UK, in 2013 and has continued to invest in its development. As well as SaaBre™ technology offering reduced production costs, BP estimates that acetic acid made using SaaBre™ technology has significantly lower carbon emissions than if produced using conventional technology.

BP is now looking at opportunities to build the first world-scale acetic acid plant using SaaBre™ technology.
Satellite surveillance for pipelines in Trinidad

BP Trinidad and Tobago (BPTT) is using satellite technology to carry out certain onshore pipeline inspections, reducing the need for helicopter flights.

BP Trinidad and Tobago (BPTT) is using satellite technology to carry out certain onshore pipeline inspections, reducing the need for helicopter flights. Traditionally, the business uses helicopters to survey areas of concern or emergent risks to its onshore pipeline. This aerial surveillance is conducted by a pipeline operator or inspector and flights typically occur every two weeks. Any issues are reported to the integrity management team for further action.

However, BPTT is testing technology that uses existing satellites fitted with optical cameras and radar sensors to capture high resolution digital images. The images are then processed by an algorithm that spots changes. Operators can access the data via an internal BP app called OneMap and can zoom into any identified areas of concern. Where necessary, further investigation then follows. This new system is faster and more comprehensive, and the data can be accessed at any time. It also has the potential to completely remove the need for scheduled aerial surveillance. Fewer flights would lead to a reduction in associated CO₂ emissions and more efficient use of ground-based inspections.
StoreDot

BP has invested in StoreDot, an Israeli based ultra-fast-charging battery start-up company, which is developing technology that could reduce recharging times for electric vehicles to five minutes.

According to BP’s 2019 Energy Outlook report there could be some 350 million electric vehicles (EV) on the road by 2040. The development of convenient and innovative EV charging technologies and networks to support this growth in EVs is a key part of BP’s strategy to advance the energy transition. As part of this we have invested in an ultra-fast-charging battery start-up company called StoreDot. As well as our investment, we are sharing our knowledge of charging infrastructure and our relationships with car manufacturers and universities. StoreDot will also have access to our service stations to demonstrate its technology.

StoreDot has successfully developed new battery technology that allows ultra-fast charging in mobile phones and other consumer electronics. It is now using that technology to create a new type of EV Flash Battery that could see EV charging times fall to five minutes – equivalent to the average amount of time it takes to fuel a gasoline powered car.

Using StoreDot technology, an EV is expected to be able to travel up to 300 miles (480 kilometres) at full charge, depending on the vehicle model. By shortening the amount of time drivers must wait to charge their cars, StoreDot technology can also reduce the number of charging posts required at any given charging station.
Strala home energy platform

BP has developed a peer-to-peer electricity trading platform that helps households with solar panels share spare electricity with other members.

BP has developed a peer-to-peer retail electricity trading platform called Strala that uses blockchain technology to allow households with rooftop solar panels and/or batteries to trade power with other users. The platform allows those with solar panels to maximize the value from spare energy, while helping those without take advantage of cheaper energy. It also includes a night-time tariff, which lowers the cost of energy in the early hours of morning. An app allows users to track trading activity and cost savings and gains.

BP is testing Strala in collaboration with UK energy supplier Tonik and is now exploring the possibility of incorporating electric vehicle smart charging functionality and vehicle-to-grid optimization.
Tribe from Lightsource BP

Lightsource BP has launched a smart home energy management system that uses data and machine learning to help customers monitor and manage their energy use.

Lightsource BP has launched a smart home energy management system called Tribe. The hub and app-based system helps customers with solar panels, energy storage and electric vehicles monitor, control and optimize their energy use. The hub uses data and machine learning to analyse consumption and automatically optimizes power flow based on current energy pricing and weather forecasts.* The app then allows customers to monitor the energy generated by their solar panels, as well as turn appliances on and off and schedule electric vehicle charging. Tribe also helps reduce reliance on electricity from the grid. The smart technology has been launched in Australia, where households are responsible for an estimated 12% of greenhouse gas emissions.†

Tricoya Technologies

BP has invested in Tricoya Technologies Limited (TTL), a UK based wood modification technology company that uses proprietary acetylation technology and the chemical acetic anhydride to alter wood’s chemistry to improve its durability.

The building industry represents a significant source of global greenhouse gas (GHG) emissions. While building regulations are helping to drive down new operational emissions, innovative materials are also needed to help reduce emissions associated with the building materials themselves.

BP has invested in Tricoya Technologies Limited (TTL), a company formed by Accsys Technologies PLC, which is a leader in developing wood modification technology.

Using proprietary acetylation technology, TTL makes acetylated wood chips, called Tricoya® Wood Elements. The acetylation process uses the chemical acetic anhydride to alter wood’s chemistry to improve durability, when compared with other natural or treated wood products. The Tricoya® Wood Elements are then used to make products such as medium density fibreboard (MDF) or particle board panels.

BP has also joined together with Accsys Technologies PLC (TTL’s parent company), TTL and Medite, a wood panel manufacturer, to create a joint venture company – called Tricoya Ventures UK Limited – to build the world’s first commercial-scale Tricoya® Wood Elements production facility. The facility is currently under construction and will sit next door to BP’s petrochemicals manufacturing facility in Hull. BP will also supply the acetic anhydride for the acetylation process.
Unmanned vessels for subsea inspections

BP is implementing an underwater inspection programme using unmanned vessels and robotics that will help reduce vessel fuel consumption.

Following successful trials, BP is rolling out an underwater inspection programme that uses unmanned vessels and robotics instead of manned vessels. This is part of a wider programme to use digitally-enabled technologies to replace fuel-intensive inspection methods in its upstream operations. By using these unmanned vessels, BP can significantly reduce the amount of fuel it needs to carry out its inspections. BP will start implementing the technology at scale from 2020.
**Virent’s BioForming® process for bio-paraxylene**

BP is working with Virent and Johnson Matthey to advance the commercialization of bio-paraxylene – a raw material used to make renewable polyester.

Polyester value chain participants are actively investigating various options to reduce greenhouse gas (GHG) emissions. Bio-paraxylene (bio-PX) is a key raw material in the production of renewable polyester which, based on BP’s preliminary evaluations, has the potential to reduce GHG emissions when compared to traditional paraxylene made from fossil fuels.

BP is working with Virent and Johnson Matthey to advance the commercialization of a chemical process that produces a reformate product from renewable sources such as corn that can be used to produce renewable fuels and processed into lower carbon intensive bio-PX. The process, called BioForming®, has been developed by Virent with Johnson Matthey.

BP is now working with the two companies to continue improving the efficiency and cost of the BioForming® process and helping to advance catalyst formulations.
Voltaware

BP has invested in Voltaware, a UK based company, which has developed a real-time energy monitoring system that allows business and residential users to track and manage their energy use.

BP has invested in Voltaware, an electricity data intelligence company that has developed a real-time electricity monitoring system that helps residential and commercial users track their energy use by individual appliance.

Voltaware’s mobile app sends customers information on their energy use and home alerts down to the appliance level whenever a significant change occurs in their usage. This helps them better understand and manage their electricity use, while remotely tracking home activity through electricity data.

Business users can also use Voltaware’s energy monitoring dashboard to track the performance of individual pieces of machinery and identify equipment in need of repair or replacement before it fails. Critical assets can be monitored at all times; real time alerts and energy reports are sent to energy managers to take action as soon as something unusual happens.
**Xpansiv CBL Holding Group**

BP has invested in Xpansiv CBL Holding Group (XCHG), a US based company, to develop a new digital trading marketplace that allows producers and traders to tag, value, and transact data-verified environmental attributes, such as carbon intensity, of globally-traded commodities such as natural gas, cement, steel, agricultural products and other raw materials.

BP has invested in Xpansiv CBL Holding Group (XCHG), a company that uses a combination of data science, cryptography and blockchain technology to turn data into useful information for commodity trading markets.*

The two businesses are now working together to develop a new digital marketplace that allows commodity producers to tag, value and transact data-verified environmental attributes, such as carbon intensity, of globally-traded commodities such as natural gas, cement, steel, agricultural products and other raw materials.

In the first instance, the new exchange, which uses cryptographic digital certificates, will help traders to value natural gas based on the fugitive methane emissions that are unintentionally released during the drilling, extraction and transportation of the natural gas. This enables greater transparency and more informed decisions for commodity market participants.

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Enabling BP or third parties to meet their low carbon objectives

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Air BP’s low carbon offer to private customers

An initiative between Air BP and BP Target Neutral to help aircraft operators offset the carbon dioxide emissions from the fuel they buy from Air BP.

The aviation industry is taking action to reduce its carbon dioxide (CO₂) emissions and has set out ambitious climate goals, including carbon neutral growth from 2020 and a 50% reduction in carbon emissions by 2050, relative to 2005.*

As a company that supplies 6.6 billion gallons of aviation fuel a year, Air BP wants to help our customers meet their goals. We work with BP Target Neutral (BPTN), our carbon offsetting programme, to create a low carbon initiative that allows aircraft operators to offset the carbon emissions related to the fuel they buy from us. BPTN helps support emission reduction projects around the world, such as forest conservation in Zambia and renewable energy in China, through the purchasing of carbon credits. As well as generating carbon credits, the projects bring economic, social and environmental benefits to local communities.

GHG offset

1,200 tonnes CO₂e [Jan – Dec 2019]

* https://www.iata.org/policy/environment/Pages/climate-change.aspx
**BP Target Neutral**

BP’s carbon offsetting programme that develops carbon neutral products and services.

BP Target Neutral (BPTN) is our carbon management offer to customers and partners. It helps customers and partners lower their carbon footprint. Through BPTN, we have launched more than 20 carbon neutral offers into the market, many of them firsts in their category. For example, BPTN has helped Castrol develop a range of certified carbon neutral lubricants for cars, commercial vehicles and wind turbines.

BPTN does this by helping customers to follow international best practice to ‘reduce, replace and neutralize’ their greenhouse gas emissions. For example, emissions can be reduced through energy efficiency initiatives, or by replacing higher carbon fuels and feedstocks with lower carbon alternatives. To become fully carbon neutral, any unavoidable emissions can be offset through the purchase of carbon credits.

BPTN purchases these credits from carefully selected emissions reduction projects all over the world, such as forest conservation in Zambia, renewable energy in China and biomass power in India. These projects also help provide economic, social and environmental benefits in their local communities. We estimate that the projects BPTN supported in 2019 helped improve the livelihoods of more than 1.2 million people through better access to energy, health, education and jobs.

Since 2006, BPTN has offset more than 5 million tonnes of carbon dioxide equivalent (CO₂e) on behalf of customers, the equivalent of taking 2 million cars off UK roads a year. In 2019 alone, the programme offset more than 1.2 million tonnes of CO₂e across all projects. Of this, 120,000 tonnes CO₂e forms BPTN’s Advancing Low Carbon (ALC) accreditation. The balance is recognized separately by the ALC programme for initiatives such as Castrol Professional.

**GHG offset**

**120,000 tonnes CO₂e [Jan – Dec 2019]**

* Based on DEFRA 2017 CO₂e kg/mile for an average UK passenger car and DfT 2016 average UK annual mileage.
Castrol carbon neutral car dealership offer

Castrol’s carbon offsetting programme, in partnership with BP’s carbon offsetting programme, BP Target Neutral, gives car dealerships the opportunity to go carbon neutral and to create carbon neutral offers for their customers by enabling them to offset their emissions.

Castrol has worked in partnership with our carbon offsetting programme, BP Target Neutral, to develop a new initiative aimed at car dealerships. The initiative works in two ways:

1. Dealers can become certified carbon neutral businesses by offsetting their own emissions through BP Target Neutral. This can help them to demonstrate their concern for the climate and help accelerate their carbon reduction programmes.

2. Dealers can also create carbon neutral offers for their customers, for example the chance to offset their own carbon emissions or a set mileage.

As part of the initiative, dealers have access to a suite of tools that they can use to better understand, measure, report and act on their own carbon footprint. To date, this programme has been launched in 12 countries around the world.

| GHG offset | 16,000 tonnes CO₂e [Jan – Dec 2019] |
CNG lower carbon road fuel in Germany

Since 2008, Aral – BP’s German retail brand – has offered customers the option to buy lower carbon compressed natural gas at selected retail stations. Since 2008, Aral – BP’s German retail brand – has sold compressed natural gas (CNG) at selected retail stations. CNG has a lower carbon intensity than traditional gasoline.

Today, CNG is available at more Aral sites than any other fuel provider in Germany and Aral is developing the network needed to help customers access this lower carbon fuel.

GHG saved

13,000 tonnes CO₂e [Jan – Dec 2019]
Global Environmental Products

BP’s Global Environmental Products business supports carbon pricing by helping enable projects that reduce or remove GHG emissions and generate environmental credits for use in carbon emissions trading markets.

BP believes that carbon pricing provides the right incentives for everyone – including energy producers and consumers alike – to play their part in reducing emissions. One fifth of the world’s greenhouse gas (GHG) emissions are now covered by carbon pricing systems and we anticipate further growth in this area.

One way that BP can support carbon pricing is to help enable projects that reduce or remove GHGs and generate environmental credits for use in carbon markets. We do this through our Global Environmental Products (GEP) business.

GEP works with project developers and owners early on to help them finance their projects – for example, by entering into environmental credit off-take agreements. These are agreements between a producer and a buyer to sell to the buyer a certain amount of future production, which provides the producer with a guaranteed stream of revenue from their projects. A guaranteed future revenue stream allows the producer to finance projects at lower cost. By being involved at project inception, BP can help with the development and funding of low carbon projects, enabling them to proceed.

Examples of credit off-takes include some of the largest carbon projects to date under California’s Cap-and-Trade Program by preserving existing carbon stocks on areas up to 450,000 acres of forest lands.

GEP also helps enable projects that generate biogas via the decomposition of organic waste. When the biogas is used to fuel vehicles, it can become eligible for the creation of environmental credits. In the US, GEP creates biogas credits from landfills, agricultural digesters and waste water treatment plants located in the US and Canada.

**GHG saved**

- Total GHG saved: 1,600,000 tonnes CO₂e [Jan – Dec 2019]
- Forestry GHG saved: 600,000 tonnes CO₂e [Jan – Dec 2019]
- Biogas GHG saved: 1,000,000 tonnes CO₂e [Jan – Dec 2019]
IT&S and Procurement’s path to carbon neutral

BP’s IT and procurement teams are taking steps to become carbon neutral by the end of 2020.

With the digital revolution changing the way we work and the amount of data that BP’s operations capture, store and process growing, the amount of computing power that the organization needs is on the rise. If left unchecked, this growth would lead to an increase in power consumption and associated carbon dioxide emissions.

That’s why BP’s IT and procurement teams have launched a series of initiatives to help them become carbon neutral by the end of 2020. Activities include reducing existing power consumption and switching to lower carbon power sources. In 2019, the team reduced emissions from their digital operations by around 50%.

GHG saved

35,000 tonnes CO₂e [Jan – Dec 2019]
OzHarvest partnership

We’ve partnered with OzHarvest, an Australian food-rescue organization, to reduce food waste and help deliver more meals to people in need. This results in a reduction of food to landfill and associated potential methane emissions.

Food waste is a growing problem; in Australia alone more than 3.1 million tonnes of food ends up as landfill.* This is important because when food rots with other organic compounds in landfill sites it releases methane, a greenhouse gas that, while short-lived in the atmosphere, has a higher global warming potential, compared to carbon dioxide (CO₂).

BP Australia is helping to address this and in 2017 created a five-year partnership with OzHarvest, Australia’s leading food rescue organization. Every week OzHarvest rescues more than 180 tonnes of food that would otherwise be destined for landfill from more than 3,500 donors, including supermarkets, hotels, airports and catering companies. It then delivers the food to more than 1,300 charities that support people in need. As a result, this food – and its associated potential methane emissions – are diverted away from landfill sites.

Under the relationship, BP Australia donates AUS$1 million a year to OzHarvest. Half of these funds are used to run the organization’s collection and delivery trucks. The other half supports OzHarvest’s education programme to raise awareness of the role that food waste plays in climate change, sustainability and hunger relief. OzHarvest also collects leftover food from over 140 of our retail stations.

GHG saved

5,700 tonnes CO₂e [Jan – Dec 2019]

Pure Planet

BP has invested in Pure Planet, a digital only supplier of sustainable energy for households in Britain.

BP has invested in Pure Planet, a digital only supplier of sustainable energy that offers electricity and carbon offset gas. It has one tariff and sells its energy at zero mark-up, keeping prices competitive for its members, who pay a monthly fee. BP provides all the electricity and gas to Pure Planet.

The electricity supplied is verified by Renewable Energy Guarantees of Origin (REGOs), and the GHG emissions from the gas supplied are offset through the purchase and retirement of carbon credits.

GHG saved/offset

Total GHG saved/offset: **280,000 tonnes CO₂e** [Jan – Dec 2019]
Gas offsets: **150,000 tonnes CO₂e** [Jan – Mar 2019]
Electricity GHG savings: **130,000 tonnes CO₂e** [Jan – Dec 2019]
Scottish Forestry Alliance

Trees planted by the BP-supported Scottish Forestry Alliance are expected to store more than one million tonnes of carbon dioxide over the next 100 years.

BP has donated £10 million to the Scottish Forestry Alliance (SFA) to help restore native woodland, improve biodiversity and research the benefits of forest creation in addressing climate change. The Scottish Forestry Alliance is a collaboration between BP, the Forestry Commission Scotland, Woodland Trust Scotland and the RSPB. Between 2000 and 2011, the SFA planted 3.4 million trees in 14 sites across 5,000 hectares and also created 60 kilometres of paths. Trees planted as part of this long-term initiative are expected to store more than one million tonnes of carbon dioxide over the next 100 years, with BP’s contribution to the project estimated to have sequestered 3,328 tonnes CO₂e during 2019 based on the 2013-2018 verification report. The sites are being assessed against the UK Forestry Commission Woodland Carbon Code to independently verify this figure. Once complete any associated carbon credits from the project will be held by BP and can be used to offset carbon-emitting activities in other parts of its business.

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Solidia Technologies

BP has invested in Solidia Technologies®, a US based company that has developed two technologies – one that reduces the amount of energy needed to make cement and another that captures and stores CO₂ in concrete.

Cement production is responsible for approximately 5-7% of global manmade carbon dioxide (CO₂) emissions. Given the scale of worldwide demand for cement, a more sustainable production method could have significant environmental benefits.

BP has invested in Solidia Technologies®, a company that has developed two technologies – one that reduces the amount of energy needed to make cement and another that captures and stores CO₂ in concrete.

The first technology, Solidia’s cement technology can be used in traditional cement kilns and reduces greenhouse gas emissions during the manufacturing process by reducing both limestone consumption and kiln temperature. Solidia has also developed a curing process that uses CO₂ instead of water to turn cement into concrete. The CO₂ is permanently and safely stored inside the concrete. As much as 80% of the water used to form the concrete products can be reclaimed for future concrete manufacturing.

Together, the technologies could reduce the carbon footprint of cement and concrete production by up to 70% compared to the manufacture of Ordinary Portland Cement and concrete. Solidia Technologies can also enable both cement and concrete manufacturers to improve their profitability through more efficient use of raw materials coupled with a significant energy savings. The company is planning to deploy its technologies at cement and concrete plants around the world, with manufacturing facilities using Solidia’s technologies currently in operation in North America and Europe.

GHG saved

230 tonnes CO₂e [Jan – Dec 2019]
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