A Message
from BP America Chairman and President Susan Dio

I’m proud to share our seventh annual U.S. Economic Impact Report, which once again highlights the breadth and reach of BP’s business in America and the many ways we are helping to advance the energy transition. Across the country, we are building a safer, stronger, more sustainable BP. This report not only demonstrates how our business has made progress in each of these areas, it also underscores our ongoing commitment to the communities where our people live and work. At BP, our ambition is to keep advancing. And over the past year, as this report makes clear, I feel confident in saying that we did.

Energizing America’s economy
BP operates in nearly 80 countries and has a larger economic footprint in the U.S. than we do anywhere else in the world. We employ about 14,000 people from coast to coast and support more than 200,000 additional American jobs through our operations and activities.

With nearly every major global business represented here, the scope of our investment in the U.S. is also significant. Between 2005 and 2018, BP invested more than $115 billion in the United States. And in 2018 alone, our operations contributed $100 billion to the national economy.

Supporting our communities
BP also supports a wide range of institutions and activities to strengthen the communities where we operate. They include partnerships with nonprofits to promote health and wellness, local literacy programs for at-risk children, and humanitarian relief following natural disasters.

Since 2014, BP has donated more than $118 million to U.S. community and environmental programs, while also maintaining business partnerships with hundreds of diverse suppliers.

Advancing the energy transition
The core of BP’s global strategy is to meet the dual challenge of providing more energy with fewer emissions — and every part of BP’s U.S. business is squarely focused on this mission. Indeed, we are relentlessly working to reduce our emissions, improve our products and create new low-carbon businesses that help us move to a lower-carbon future.

As we do, safety remains our number one priority — the foundation of everything we do, every single day.

None of it would be possible without thousands of talented, dedicated professionals who work for and with BP across the nation. To them, we owe a special thanks.

To you, we owe our steadfast commitment that BP will keep advancing in the U.S., both today and for many years to come.

Susan Dio
Chairman and President, BP America
The Numbers Tell the Story

Safety is our No.1 priority

BP supports 200,000+ jobs across the U.S.

BP generated $100 billion in economic value in the U.S. in 2018

BP invested $115 billion+ in the U.S. between 2005 and 2018

BP employs about 14,000 people across the U.S.

Between 2014 and 2018, BP donated $118 million+ to U.S. community programs

BP paid 6,000 U.S. vendors in 2018

In 2018, BP produced 772,000 barrels of oil equivalent per day in the U.S.
BP delivers energy products and services to people around the world. The energy BP produces supports economic growth and improves quality of life for millions of people. BP has a diverse portfolio across businesses, resource types and geographies. The company’s main operations include upstream, downstream and renewables businesses, along with well-established trading capabilities.

**Finding oil and gas**
First, BP acquires exploration rights. Then, the company searches for hydrocarbons beneath the Earth’s surface using seismic imaging technologies.

**Developing and extracting oil and gas**
Once BP has found hydrocarbons, the company drills into the Earth to bring them to the surface.

**Transporting and trading**
BP moves hydrocarbons using pipelines, ships, trucks and trains.

**Manufacturing and marketing fuels and products**
BP refines, processes and blends hydrocarbons to make fuels, lubricants and petrochemicals. BP also supplies its customers with fuel for transportation, energy for heat and light, lubricants to keep engines moving, and petrochemicals required to make everyday items.

**Generating renewable energy**
BP invests in and develops advanced biofuels, solar energy and biopower, and it also operates a major wind business.

**Venturing**
BP Ventures focuses on investments in advanced mobility, bio and low-carbon products, carbon management, digital transformation, and power and storage.

**How BP Operates**
A closer look at the oil and gas business

150+ years of history in the U.S.
4 production platforms operated in the deepwater Gulf of Mexico — Atlantis, Mad Dog, Na Kika and Thunder Horse
7,200 BP- and ARCO-branded retail sites in the U.S. at the end of 2018
470,000 net acres of BHP assets acquired by BP’s BPX Energy business in 2018
3 refineries — Cherry Point (Wash.); Toledo (Ohio); Whiting (Ind.)
10 wind farms in seven states
1.4 million barrels of oil equivalent produced and refined each day
2 petrochemicals sites — Cooper River (S.C.) and Texas City (Texas)
BP announced in August 2019 that it has agreed to sell its entire business in Alaska to Hilcorp Alaska. Subject to state and federal regulatory approval, the transaction is expected to be completed in 2020.

1. BP-operated and BP-owned terminals in Dubuque, Iowa, and Whiting, Indiana, as well as 12 terminals in 12 states.
2. BP has a 25 percent interest through a joint venture with its partner and terminal operator Kinder Morgan in Rochelle, Chicago and Wood River in Illinois; Dayton and Cincinnati, Ohio; Brooklyn, New York; Carteret, New Jersey; Curtis Bay, Maryland; Atlanta and Doraville, Georgia; Indianapolis, Indiana; Spring Valley, Minnesota; and Richmond, California.
3. Indicates a state where Air BP is active at one or more airports.
### BP’s Economic Impact Across the U.S.

**Alabama** | 270+ JOBS SUPPORTED | $30m+ VENDOR SPEND  
**Alaska** | 8,000+ JOBS SUPPORTED | $700m+ VENDOR SPEND  
**Arizona** | 30 JOBS SUPPORTED | $28m+ VENDOR SPEND  
**Arkansas** | 60+ JOBS SUPPORTED | $23m+ VENDOR SPEND  
**California** | 700+ JOBS SUPPORTED | $370m+ VENDOR SPEND  
**Colorado** | 1,800+ JOBS SUPPORTED | $195m+ CAPITAL & OPERATING SPEND*  
**Connecticut** | 7 JOBS SUPPORTED | $57m+ VENDOR SPEND  
**Delaware** | 15 JOBS SUPPORTED | $46m+ VENDOR SPEND  
**District of Columbia** | 225+ JOBS SUPPORTED | $55m+ VENDOR SPEND  
**Florida** | 360+ JOBS SUPPORTED | $60m+ VENDOR SPEND  
**Georgia** | 100+ JOBS SUPPORTED | $245m+ VENDOR SPEND  
**Hawaii** | 0 JOBS SUPPORTED | $13.2k+ VENDOR SPEND  
**Idaho** | 70+ JOBS SUPPORTED | $11m+ VENDOR SPEND  
**Illinois** | 7,100+ JOBS SUPPORTED | $805m+ VENDOR SPEND  
**Indiana** | 12,600+ JOBS SUPPORTED | $120m+ VENDOR SPEND  
**Iowa** | 30+ JOBS SUPPORTED | $13.2m+ VENDOR SPEND  
**Kansas** | 25+ JOBS SUPPORTED | $675m+ VENDOR SPEND  
**Kentucky** | 15 JOBS SUPPORTED | $15.6m+ VENDOR SPEND  
**Louisiana** | 3,000+ JOBS SUPPORTED | $360m+ VENDOR SPEND  
**Maine** | 10+ JOBS SUPPORTED | $5.4m+ VENDOR SPEND  
**Maryland** | 260+ JOBS SUPPORTED | $11.9m+ VENDOR SPEND  
**Massachusetts** | 20+ JOBS SUPPORTED | $35m+ VENDOR SPEND  
**Michigan** | 120+ JOBS SUPPORTED | $85m+ VENDOR SPEND  
**Minnesota** | 30+ JOBS SUPPORTED | $285m+ VENDOR SPEND  
**Mississippi** | 700+ JOBS SUPPORTED | $3.3m+ VENDOR SPEND  
**Missouri** | 60+ JOBS SUPPORTED | $62m+ VENDOR SPEND  
**Montana** | 30+ JOBS SUPPORTED | $47m+ VENDOR SPEND  
**Nebraska** | 0 JOBS SUPPORTED | $91m+ VENDOR SPEND  
**Nevada** | 9 JOBS SUPPORTED | $5.9m+ VENDOR SPEND  
**New Hampshire** | 3 JOBS SUPPORTED | $3.7m+ VENDOR SPEND  
**New Jersey** | 1,200+ JOBS SUPPORTED | $185m+ VENDOR SPEND  
**New Mexico** | 390+ JOBS SUPPORTED | $130m+ CAPITAL & OPERATING SPEND*  
**New York** | 300+ JOBS SUPPORTED | $275m+ VENDOR SPEND  
**North Carolina** | 60+ JOBS SUPPORTED | $46m+ VENDOR SPEND  
**North Dakota** | 0 JOBS SUPPORTED | $6.2m+ VENDOR SPEND  
**Ohio** | 6,100+ JOBS SUPPORTED | $995m+ VENDOR SPEND  
**Oklahoma** | 1,300+ JOBS SUPPORTED | $300m+ CAPITAL & OPERATING SPEND*  
**Oregon** | 20+ JOBS SUPPORTED | $120m+ VENDOR SPEND  
**Pennsylvania** | 280+ JOBS SUPPORTED | $315m+ VENDOR SPEND  
**Rhode Island** | 4 JOBS SUPPORTED | $1.8m+ VENDOR SPEND  
**South Carolina** | 900+ JOBS SUPPORTED | $155m+ VENDOR SPEND  
**South Dakota** | 7 JOBS SUPPORTED | $1.5m+ VENDOR SPEND  
**Tennessee** | 70+ JOBS SUPPORTED | $135m+ VENDOR SPEND  
**Texas** | 21,100+ JOBS SUPPORTED | $6.1b+ VENDOR SPEND  
**Utah** | 30+ JOBS SUPPORTED | $36m+ VENDOR SPEND  
**Vermont** | 0 JOBS SUPPORTED | $23k+ VENDOR SPEND  
**Virginia** | 30+ JOBS SUPPORTED | $39m+ VENDOR SPEND  
**Washington** | 10,200+ JOBS SUPPORTED | $480m+ VENDOR SPEND  
**West Virginia** | 2 JOBS SUPPORTED | $52m+ VENDOR SPEND  
**Wisconsin** | 10+ JOBS SUPPORTED | $62m+ VENDOR SPEND  
**Wyoming** | 450+ JOBS SUPPORTED | $130m+ CAPITAL & OPERATING SPEND*  
**United States** | 8,000+ JOBS SUPPORTED | $14b+ TOTAL VENDOR SPEND  

**NOTE**  
The BP employment figures used to help validate number of jobs supported in each state are based on the work locations of employees and contractors as of June 30, 2019, except in the cases of offshore workers, in which case a worker’s state of residence is counted.  

**NOTE**  
The state totals for how much BP spends with vendors are based on the location of the addresses to which BP sent payments in 2018.  

**NOTE**  
The number of jobs supported includes BP employees.  

* This represents only capital and operating expenditures for BP’s lower 48 onshore business in the state in 2018.
BP’s goals are clear: no accidents, no harm to people and no damage to the environment. That’s a huge responsibility — one the company does not take for granted.

A safer BP
From 2005 to 2010, BP had serious incidents in its refining, pipeline and offshore operations — in Texas City, Alaska and the Gulf of Mexico, respectively. Each had different causes, and each taught BP important safety lessons.

In the years since, BP has transformed itself by introducing new training programs, deploying innovative technologies and strengthening its safety culture. As a result, the people who work for BP today are more equipped to operate safely and better prepared for any situation.

From 2010 through 2018, BP’s most important safety metrics showed significant improvement. For instance, the company’s total number of Tier 1 process safety events — the most consequential events involving an unplanned or uncontrolled release of materials — fell by roughly 75 percent across the globe.

BP has made progress, and it remains focused on continuous improvement. Complacency undermines safety, which is why BP is working every day to become even better, even safer.

How BP works
BP starts with its core values, including safety, respect, excellence, courage and one team. These values define BP, and its people strive to demonstrate them in all aspects of their work.

BP has company-wide guidelines for how to operate, which it calls its Operating Management System (OMS), and it organizes people according to their functional responsibilities. Each function develops its own rules and requirements that are consistent with BP’s broader OMS guidelines.

In the company’s Global Wells Organization, for example, drillers around the world meet specific requirements in their training, contractor management and well operations. This helps drillers everywhere operate in a similar manner.

All BP teams can ask the company’s Safety and Operational Risk (S&OR) team any questions they have about how to safely do their jobs. While front line workers are most responsible for safe and reliable operations, the S&OR team offers an additional and valuable layer of assistance and expertise.

Safety is the foundation of everything BP does, every day.
state-of-the-art simulators that can replicate nearly every critical job on an offshore drilling rig. This enables offshore teams to practice scenarios relevant to specific wells and to prepare for a wide range of contingencies.

BP also uses simulators to train refinery and chemical plant workers. These systems allow people to practice different tasks — such as unit startup and shutdown, and pump and valve operations — under both normal and abnormal conditions.

How BP responds

While BP instructs, trains and practices to prevent incidents, it also prepares its teams to respond in the unlikely event that one were to occur. This way, BP is prepared to act quickly to minimize the impact of an incident and protect people and the environment.

BP’s response plans and preparation incorporate what it has learned over many years of operation, including from the 2010 Deepwater Horizon incident. For example, BP has global standards and experts to help prepare and equip teams in deepwater regions to respond to an oil spill, and it has shared research and best practices with governments, partners and competitors.

Even as BP has prepared to respond to an incident, it also has worked hard to prevent such a response from being needed. Among its many initiatives, BP continues to work with industry members to improve standards on the safety and reliability of subsea blowout preventers and other critical equipment.

Technology

Once people are trained and on the job, BP uses leading-edge technologies to help its teams predict where safety challenges might arise so that they can intervene and prevent incidents from occurring.

For example:

- BP’s Remote Collaboration Center offers round-the-clock support for deepwater well operations in the Gulf of Mexico, providing offshore personnel with 24/7 assistance from onshore experts.
- BP has deployed a suite of intuitive computer consoles — known as BP Well Advisor — that use sensory technology to gather data about the company’s well operations and then translate it into simple, real-time indicators that help rig crews and office-based experts enhance safety and performance.
- BP uses a fleet of drones and robotic crawlers to safely and thoroughly inspect its offshore facilities in the Gulf of Mexico, reducing the need for people to do the job harnessed to ropes.
- At its Cherry Point Refinery, BP employs phased array ultrasonic testing, which uses soundwaves to check the structural integrity of equipment and piping.

Culture

BP workers provide the ultimate safety net. Anyone, anywhere, can and should stop any job for any reason if they think it is unsafe. This is the most important responsibility workers have.

To have a strong safety culture, BP has to promote a strong speak-up culture — in which employees and contractors alike are encouraged to raise questions or concerns. BP supervisors know they must be accessible to their team members so that everyone feels comfortable speaking up.

Commitment to safety

BP is committed to the safety of its people and the communities where it operates. This requires constant vigilance and dedication.

That’s why BP is working every day to improve its training, technology and culture.
In the past five years alone, BP and the BP Foundation donated more than $118 million to U.S. community programs, from education initiatives for underprivileged children to strategic health and wellness partnerships.

BP Foundation
The BP Foundation is a charitable organization, separate from but funded entirely by BP, that supports philanthropic activities around the world. In 2018, the Foundation provided funds to support Alaska earthquake relief efforts, victims of California wildfires and Hurricane Florence recovery efforts. As part of its commitment to service, the foundation matches personal charitable donations — including donations of time and effort — made by BP employees.

Supplier diversity
BP was one of the first major corporations in the U.S. to create a formal program aimed at increasing supplier diversity. In 2018, BP partnered with over 1,100 diverse and small businesses — including certified minority, women, LGBT and veteran-owned enterprises — while creating a strong pipeline of other potential suppliers.

Marc Mills of Pacific Rim Capital, which leases handling equipment, says: “BP has opened up a whole new market for us. Our contract with the Whiting Refinery has allowed us to lease a more complex range of equipment, and we are now leasing assets in the oil field.”

STEM education
For more than six decades, BP has supported science, technology, engineering and math (STEM) education programs across the nation, investing about $28 million in the past five years alone.

- BP has partnered with AFS Intercultural Programs to host the BP Global STEM Academies, a study abroad initiative focused on building STEM skills and intercultural awareness.
- Through the BP STEM Ambassador program, employees build strategic partnerships with schools and local organizations nationwide, working directly with students, teachers and administrators.
- BP also supports the Million Women Mentors project, which helps young women of all backgrounds succeed in science and technology fields.

Military veterans
BP is proud to support American military personnel both during and after their service. The company is committed to helping veterans find new career paths, stay active no matter their physical abilities and continue serving as leaders for the nation.

- Through American Corporate Partners, BP employees provide one-on-one mentoring for veterans to help guide their transition to the private sector.
- Together with the Hiring Our Heroes initiative, BP makes it easier for veterans, transitioning service members and military spouses to find meaningful employment.

BP’s commitment to America goes well beyond providing the energy and jobs that fuel economic prosperity. The company also supports a wide range of institutions and initiatives that strengthen the communities where its employees live and work.
• BP’s Military Placement Program offers veterans 12-month paid opportunities with BP’s trading business.

Paralympic support
A longtime supporter of the Paralympic movement and Team USA, BP sponsors six U.S. Paralympic national teams. Three of them competed in the PyeongChang 2018 Paralympic Winter Games (alpine skiing, Nordic skiing and snowboarding), while the others will represent the nation at the Tokyo 2020 Paralympic Games (cycling, swimming, and track and field).

United Way
A strong supporter of the United Way (UW), BP has raised more than $12 million for local UW organizations over the past five years alone.

BP also supports dozens of local initiatives around its operating locations from coast to coast, as well as flagship events and charities near its hubs in Houston and Chicago.

Making a difference in Texas
American Heart Association
In 2019, BP launched a strategic partnership with the American Heart Association (AHA), which will create an awareness and education strategy for the Greater Houston area. This includes a broad marketing campaign and sponsorship of major local AHA initiatives, including the organization’s signature Heart Walk and Go Red for Women movement.

BP MS 150
For the 19th year, BP was proud to serve as title sponsor of the BP MS 150 bike ride, the National Multiple Sclerosis (MS) Society’s largest annual fundraising event. Since 2001, BP and Team BP riders have raised or contributed over $21 million to support MS programs, including more than $670,000 in donations in 2019.

Houston Open
BP has teamed up with the Astros Golf Foundation as one of the Founding Community Partners of the Houston Open, a professional golf tournament. The Astros Golf Foundation has pledged annual commitments of $500,000 to First Tee, a nonprofit that encourages young people to get involved with golf.

Houston Livestock Show and Rodeo
Since 2015, BP has contributed more than $2.5 million to the Houston Livestock Show and Rodeo (HLSR), including over $260,000 for HLSR scholarship programs.

Making a difference in Chicagoland
Student Conservation Association
Since 2015, BP has contributed $2 million to support environmental programs for students in the Chicagoland and northwest Indiana regions.

Through a partnership with the Student Conservation Association, the company has helped improve conditions at Chicago’s Calumet Watershed and the Indiana Dunes National Lakeshore, empower women in conservation, and support local youths to gain valuable skills and experience.

Chicago Architecture Biennial
Since 2015, BP has contributed $4.5 million toward the Chicago Architecture Biennial, the largest international survey of contemporary architecture in North America.

In addition to serving as the 2019 event’s founding sponsor, BP launched the third BP Student Ideas Competition, which empowers Chicagoland youths to creatively reimagine their civic institutions as places for learning and connecting people.
BP's unique strengths in exploration, resource development and gas value chains are supported by leading technology positions in seismic imaging, enhanced hydrocarbon recovery and digital innovation.

“We are making our business fit for the future by investing in advanced technologies that will enable us to bring energy to our customers reliably and much more efficiently,” says Ahmed Hashmi, chief digital and technology officer, Upstream.

Exploring the subsurface
Seismic imaging maps the Earth’s subsurface to find oil and gas resources, appraise and characterize reservoirs, and detect changes in those reservoirs over time.

BP's Center for High-Performance Computing (CHPC) in Houston, one of the world’s most powerful supercomputers for commercial research, provides crucial support for the company's Gulf of Mexico business.

Proprietary algorithms were applied on seismic data run at the CHPC to enhance a technique known as Full Waveform Inversion, which matches seismic simulations with existing seismic data to produce high-quality subsurface images. In the past three years, this technique has uncovered 400 million barrels of oil in place at the Atlantis field, as well as 1 billion barrels at the Thunder Horse field.

Optimizing production
APEX is a sophisticated surveillance and simulation system that creates a digital twin — a virtual copy of BP's production systems. This helps BP engineers boost production by allowing them to test different scenarios in minutes.

The system constantly compares models with actual data to detect irregularities and shows BP’s teams how to safely optimize production. The global deployment of APEX added 19,000 barrels of oil equivalent per day of net annualized production in 2018.

Meanwhile, Plant Operations Advisor (POA) — a digital technology deployed in partnership with Baker Hughes, a GE company — monitors and integrates data from BP’s oil and gas facilities. By processing more than 138 million data points per day, POA delivers important insights on performance and maintenance.

The use of advanced technology is central to BP’s ability to meet the dual challenge of delivering energy the world needs while reducing emissions.

Enhancing safety
BP is using advanced technology such as drones, crawlers and remotely operated vehicles to remove people from harm’s way. For example, a robotic X-ray crawler in Alaska can detect corrosion under insulation in flow lines more quickly and with less radiation exposure than manual X-ray inspections.

Meanwhile, BPX Energy has created an algorithm-based work management and logistics system, inspired by next-day parcel delivery firms, to help its operators make the most of time spent at well sites.

The business has also brought the consumer electronics revolution to the oil field with the use of wearable technology such as smart glasses, which connect technicians directly with experts in a control center. Using augmented reality, the experts can overlay instructions and data in the technician’s field of vision as they work on the equipment. This increases productivity while also improving safety and efficiency.

Developing unconventionals
Advanced technology is crucial to the development of newly acquired unconventional shale assets for BPX Energy, the company’s onshore U.S. business.

BPX Energy has created an algorithm-based work management and logistics system, inspired by next-day parcel delivery firms, to help its operators make the most of time spent at well sites.

The business has also brought the consumer electronics revolution to the oil field with the use of wearable technology such as smart glasses, which connect technicians directly with experts in a control center. Using augmented reality, the experts can overlay instructions and data in the technician’s field of vision as they work on the equipment. This increases productivity while also improving safety and efficiency.
Alaska has been instrumental in BP’s growth and success for well over half a century. BP’s rich history in the state includes drilling the confirmation well for the massive Prudhoe Bay oil field in 1968 and helping build the 800-mile Trans Alaska Pipeline in the mid-1970s.

In August 2019, BP signed an agreement with Hilcorp to sell its entire business in Alaska as it explores other opportunities that are more closely aligned with its long-term strategy and more competitive for its investment. The sale also supports the company’s two-year $10 billion divestment program to further strengthen its balance sheet.

“Alaska has been a core part of BP for 60 years and saying goodbye will not be easy,” says Janet Weiss, BP Alaska president. “Our people have achieved incredible success over the decades developing and maintaining these hugely important assets, but we are confident this sale is in BP’s and the state’s best interests and the business will be best positioned for the future with Hilcorp.”

A lower carbon footprint
With a long history of pioneering innovations in oil field technology at Prudhoe Bay, BP has continued using new strategies to extend the life of the field while reducing emissions.

While maintaining relatively consistent oil production levels over the past four years, BP reduced Prudhoe Bay’s greenhouse gas emissions by approximately 2 percent through project optimization.

In 2018, BP also completed some of the largest carbon credit offset projects in the nation with two Alaska Native corporations through the California Air Resource Board. Carbon offsets are created through investment in activities that reduce greenhouse gas emissions or absorb carbon dioxide. In this case, the corporations agreed to manage their forestland to soak up CO₂ from the atmosphere.

In the community
Beyond its operations, BP donated $4 million to organizations across Alaska in 2018, with employees supporting hundreds of education and community groups. *

* The BP Teachers of Excellence Program has recognized nearly 800 Alaska educators in its 24-year history.

* The company has also awarded more than $3.5 million to 860 graduating high school seniors as part of the Principals’ and Commissioner’s Scholarship Program, one of the longest-running initiatives of its kind in the state.

Over six decades, BP has built a world-class business in Alaska. The company’s activities across the state — including its operations at the giant Prudhoe Bay oil field — have been crucial to Alaska’s economy and America’s energy security.
With more than three decades of experience in the deepwater Gulf of Mexico, BP’s next wave of growth is underpinned by several new major projects already underway, including:

- a $1.3 billion expansion at the Atlantis field
- a second major expansion at the Thunder Horse field, expected to boost production at its largest platform by 50,000 barrels of oil a day
- the $9 billion Mad Dog 2 development expected to start up in late 2021 — including the new Argos floating production platform, which will produce up to 140,000 barrels of crude oil per day from as many as 14 production wells.

As one of the Gulf of Mexico’s largest leaseholders, BP also has significant exploration and appraisal opportunities to evaluate, including recent discoveries.

“Our current development plans show how our investment in technology and digital techniques create real value — by identifying opportunities, driving efficiencies and enabling the delivery of major projects,” says Starlee Sykes, BP’s regional president for the Gulf of Mexico and Canada.

Advanced technology
BP uses advanced technology to produce oil more safely, more efficiently and more sustainably.

The company’s next phase of developments resulted from recent breakthroughs at its Center for High-Performance Computing in Houston. Advanced seismic imaging revealed an extra 400 million barrels of oil in place at the Atlantis field and another 1 billion at Thunder Horse.

Digital tools such as Plant Operations Advisor (POA) — developed in partnership with Baker Hughes, a GE company — enhance safety and plant reliability. Deployed on all four of BP’s gulf platforms, POA helps prevent unplanned downtime, allowing engineers to identify potential issues in real time.

Meanwhile, BP uses a fleet of drones and robotic crawlers to safely and thoroughly inspect its offshore facilities, reducing the need for people to do the job harnessed to ropes.

Happening onshore
To support its Gulf of Mexico business, BP maintains a logistics base in Port Fourchon, Louisiana, along with a heliport in Houma, Louisiana.

Across Louisiana, BP employs some 400 people and supports more than 2,600 additional jobs, spending about $360 million annually with nearly 300 suppliers.

Offshore teams also receive 24/7 support — including constant communication and real-time data analysis — from BP’s Houston-based Remote Collaboration Center, a global monitoring center for offshore drilling rigs.

BP is one of the largest oil producers in the deepwater Gulf of Mexico. Its strategy is rooted in continued investment and exploration around four operated hubs: Atlantis, Mad Dog, Na Kika and Thunder Horse.
The 2018 deal to purchase BHP’s U.S. onshore assets upgraded and transformed the BPX Energy portfolio, increasing proved crude oil reserves tenfold. It also represented BP’s largest acquisition since buying ARCO in 1999, with Group Chief Executive Bob Dudley describing it as “transformational.”

The new world-class unconventional oil and gas assets acquired last year are located in the Permian-Delaware and Eagle Ford basins in Texas, and the Haynesville basin in Texas and Louisiana. This move was part of a larger transformation underway in the business, which began operating as a standalone entity in 2015. Since then, BPX Energy has built a premier onshore business, focused on delivering free cash flow growth through a team with a proven track record.

“We are entering a new and exciting phase of our growth that’s defined not only by continued strong returns and operational performance, but also by relentless innovation aimed at making our business even safer, smarter and more environmentally sustainable,” says Dave Lawler, CEO of BPX Energy.

While BPX Energy is in the process of divesting legacy assets in Wyoming, Colorado, Oklahoma and New Mexico, it expects to more than double its annual capital spending — to more than $2 billion a year — on its newly expanded portfolio in Texas and Louisiana.

Reducing emissions

BPX Energy remains an industry leader in understanding the challenge posed by methane emissions and taking voluntary actions to achieve significant reductions in this area. For example, the business has:

- replaced around 99 percent of its high-bleed pneumatic controllers with continuous low-bleed and intermittent controllers
- introduced drone-mounted sensors to help inspect equipment, which can cover multiple well pads more efficiently than hand-held devices
- implemented “green completion” technology on its wells before it was a regulatory requirement, helping to minimize gas flaring and venting while recovering more for sale.

In addition, since it began operating the newly acquired Permian assets in March 2019, BPX Energy has started constructing centralized facilities which, combined with other emissions reduction efforts, will reduce routine flaring.

In partnership

In 2019, BP and the Environmental Defense Fund announced a three-year strategic commitment to advance technologies and practices to reduce methane emissions from the oil and gas supply chain. The agreement means the two organizations are working together, along with universities and other experts, to test technologies and strategies to improve methane management.

In numbers

The acquisition of BHP’s U.S. shale assets added 190,000 barrels of oil equivalent per day to the BPX Energy portfolio, of which around 45 percent comprised high-value liquid hydrocarbons.

That production adds to the roughly 315,000 barrels of oil equivalent per day BPX Energy operated before the transaction with BHP, in fields spanning five states.

Since 2000, the business has cut its total greenhouse gas emissions by more than 2 million metric tons of carbon dioxide equivalent, comparable to the annual electricity-related emissions of more than 300,000 typical homes.

In numbers

While BPX Energy is in the process of divesting legacy assets in Wyoming, Colorado, Oklahoma and New Mexico, it expects to more than double its annual capital spending — to more than $2 billion a year — on its newly expanded portfolio in Texas and Louisiana.

Reducing emissions

BPX Energy remains an industry leader in understanding the challenge posed by methane emissions and taking voluntary actions to achieve significant reductions in this area. For example, the business has:

- replaced around 99 percent of its high-bleed pneumatic controllers with continuous low-bleed and intermittent controllers
- introduced drone-mounted sensors to help inspect equipment, which can cover multiple well pads more efficiently than hand-held devices
- implemented “green completion” technology on its wells before it was a regulatory requirement, helping to minimize gas flaring and venting while recovering more for sale.

In addition, since it began operating the newly acquired Permian assets in March 2019, BPX Energy has started constructing centralized facilities which, combined with other emissions reduction efforts, will reduce routine flaring.

In partnership

In 2019, BP and the Environmental Defense Fund announced a three-year strategic commitment to advance technologies and practices to reduce methane emissions from the oil and gas supply chain. The agreement means the two organizations are working together, along with universities and other experts, to test technologies and strategies to improve methane management.

In numbers

The acquisition of BHP’s U.S. shale assets added 190,000 barrels of oil equivalent per day to the BPX Energy portfolio, of which around 45 percent comprised high-value liquid hydrocarbons.

That production adds to the roughly 315,000 barrels of oil equivalent per day BPX Energy operated before the transaction with BHP, in fields spanning five states.

Since 2000, the business has cut its total greenhouse gas emissions by more than 2 million metric tons of carbon dioxide equivalent, comparable to the annual electricity-related emissions of more than 300,000 typical homes.
BP’s refineries are applying new technologies that help produce cleaner, more energy-efficient fuels from a wide variety of oil and gas resources, as well as sources such as vegetable and animal fats and oils.

BP’s refining technology teams have the scientific knowledge required to safely and reliably process these new resources in a cost-effective way.

“Understanding feedstocks at the molecular level allows us to optimize our processes and is key to running an efficient refining business,” says Andrew Waller, technology development director with BP’s refining, technology and engineering team.

Safer facilities

BP’s expertise in advanced analytical techniques, coupled with a deep understanding of process technologies, allows its teams to predict how crude oils or other feedstocks may affect individual refinery units.

Intelligent operations

Meanwhile, BP is creating a digitally enabled manufacturing future, deploying cutting-edge technology at its refineries and petrochemicals sites.

• In partnership with Beyond Limits, a California-based spinoff of NASA’s Jet Propulsion Laboratory, BP is applying the same artificial intelligence (AI) that directs the Mars Rover in creating a cognitive agent that advises real-time, complex process optimization decisions.

• BP will soon be able to stream nearly 1 million process sensors from all its manufacturing sites to a central data platform at sub-second intervals. This will allow the modeling of all its systems on a common platform.

• At its Cherry Point Refinery, BP is building machine-learning applications that automatically analyze historic laboratory tests and operations data to enhance process optimization with AI solutions.

Formulated products

For more than a century, Castrol — BP’s global lubricants brand — has pioneered innovative technologies that can be used in extreme environments.

NASA has once again turned to Castrol’s Braycote line to keep its Mars InSight lander, currently studying what’s below the Red Planet’s surface, running smoothly.

Back on Earth, Castrol is offering a growing number of carbon-neutral products, several of which have been accredited through BP’s Advancing Low Carbon program. They include EDGE Bio-Synthetic and Magnatec Bio-Synthetic, which are made with 25 percent sugarcane-derived oil compounds.

Castrol also makes other carbon-neutral engine oils (EDGE Professional), carbon-neutral lubricants for the wind industry (Optigear) and carbon-neutral lubricants for the commercial trucking industry (VECTON).

In the wind sector, Castrol has a joint venture called ONYX InSight, a digital monitoring platform that helps wind farm operators track the condition of turbines, optimize maintenance and reduce operating costs. ONYX InSight has deployed this technology to thousands of turbines across the U.S. wind market.

Turn to page 47 for more on Castrol’s technology.
Whiting is BP’s largest refinery anywhere in the world. Its products — ranging from gasoline to jet fuel — help keep the Midwest moving.

“As the largest refinery within BP, we need to embrace the dual challenge — a world that is demanding lower-carbon energy, while at the same time demanding more energy overall,” says Refinery Manager Don Porter. “We are positioning ourselves to thrive in this evolving context.”

Building for the future

Whiting is constructing a new naphtha hydrotreating unit that will significantly reduce the amount of sulfur in its fuels. The new unit will be operational in 2020.

Meanwhile, the refinery has developed and implemented new performance indicators for optimizing and minimizing energy use on a daily basis.

Among its efficiency initiatives, the facility installed equipment to generate steam from exhaust gas. This reduces the amount of steam generated from its boilers, which in turn reduces the amount of fuel burned and associated greenhouse gas emissions.

The Whiting team is using innovative technologies to protect the environment and boost efficiency, as well as to improve safety.

- Gas cloud imaging cameras have the capability to continuously monitor facilities and identify new methane leaks earlier than during routine inspections.
- The refinery has deployed drones to inspect flares, rather than have workers climb up temporary scaffolding. The team also uses robots to clean sulfur tanks.

Fueling the Midwest

Located on the Lake Michigan shoreline in northwest Indiana, 17 miles southeast of downtown Chicago, Whiting is the largest refinery in the Midwest. It makes enormous contributions to the region’s transportation network, processing around 430,000 barrels of crude oil every day.

The refinery produces around 10 million gallons of gasoline, 4 million gallons of diesel and 2 million gallons of jet fuel each day.

Since opening its gates in 1889 as part of John D. Rockefeller’s Standard Oil Company, Whiting has been a key anchor of the northwest Indiana economy, as well as the surrounding community.

The Lakeshore Chamber of Commerce recognized the refinery in 2019 for its “outstanding contributions to economic growth and betterment of northwest Indiana.”

Over the years, Whiting and its employees have supported a diverse range of local and regional institutions, such as Ivy Tech Community College, Purdue University and the Lake Area United Way.

Marking 130 years of operations in 2019, BP’s Whiting Refinery team is looking to the future by making strides to improve the facility’s efficiency and help reduce its emissions.
Located in Blaine, Washington, BP’s Cherry Point Refinery is the first and only refinery in the Pacific Northwest capable of manufacturing diesel made from biomass-based feedstocks, which are processed alongside conventional feedstocks in an existing ultra-low-sulfur diesel unit. This process supports compliance with government programs that require supply of low-carbon and renewable fuels to the marketplace.

Renewable diesel has the same properties as conventional ultra-low-sulfur diesel, but a lower carbon footprint. “As the world demands more energy, it also demands that it be produced and delivered in new and cleaner ways,” says Refinery Manager Bob Allendorfer. “At Cherry Point, we are embracing the latest technologies to make cleaner transportation fuels in safer, more sustainable and efficient ways.”

Investing in the future

In 2019, the refinery completed a 22-month modernization project to help reduce emissions and improve energy efficiency. The improvements contribute to more efficient operations for a refinery that supplies a broad range of fuels, including gasoline, diesel and jet fuel, and other specialty products.

In numbers

Over the past decade, BP has invested more than $1.5 billion in capital improvements at its Cherry Point Refinery.

Cherry Point can process approximately 250,000 barrels of crude oil per day on average — that’s enough to fuel 31,000 round-way road trips from Seattle to New York City.

Cherry Point is the first BP refinery to be accredited through the company’s Advancing Low Carbon program, thanks to its production of certain lower-carbon fuels.

Located in the Pacific Northwest, BP’s Cherry Point Refinery helps meet the increasing energy demand from consumers across Washington state and beyond, by providing cleaner fuels with a reduced carbon footprint.

Inspiring tomorrow’s innovators

Cherry Point has been a cornerstone of the local community since it first opened in 1971. In addition to its environmental work, the refinery invests in the next generation of energy and technology workers by supporting local schools and education initiatives.

Through the BP STEM Ambassador program, Cherry Point employees deliver hands-on demonstrations in classrooms, supporting Girl Scout merit badges for engineering and robotics, and facilitating workshops at Western Washington University.
As it marks 100 years of operations, the BP-Husky Toledo Refinery — located in the city of Oregon, Ohio — is undergoing major improvements to be fit for the future.

In the spring of 2019, the refinery team completed a significant maintenance turnaround, a project to improve reliability and help the facility maintain profitable operations for years to come.

During the turnaround project, the refinery brought in an extra 2,000 contractors to work alongside its regular personnel. The renovations and equipment maintenance included repairing the refinery’s isocracker, a key unit for upgrading crude products into high-value transport fuels.

In the past year, the Toledo Refinery has also commissioned two projects to help reduce the environmental impact of its operations.

- A new $115 million coker gas plant removes both sulfur and light hydrocarbon compounds from the gas produced in the coker units. This process results in fewer emissions from the refinery’s furnaces and optimizes the quantity of fuel burned.

- An $18 million project at both coker units reduces the amount of hydrocarbons released during a cleaning process.

BP-Husky Toledo Refinery

In numbers

- The BP-Husky Toledo Refinery can process up to 160,000 barrels of crude oil each day, providing the Midwest with gasoline, diesel, jet fuel, propane and asphalt.

- The refinery can produce enough gasoline each day for an average car to drive back and forth from Toledo to Miami more than 30,000 times.

- BP supports more than 6,100 jobs in Ohio and in 2018 spent nearly $1 billion with vendors in the state.

- As it marks 100 years of operations, the BP-Husky Toledo Refinery — located in the city of Oregon, Ohio — is undergoing major improvements to be fit for the future.

- In the spring of 2019, the refinery team completed a significant maintenance turnaround, a project to improve reliability and help the facility maintain profitable operations for years to come.

- During the turnaround project, the refinery brought in an extra 2,000 contractors to work alongside its regular personnel. The renovations and equipment maintenance included repairing the refinery’s isocracker, a key unit for upgrading crude products into high-value transport fuels.

- In the past year, the Toledo Refinery has also commissioned two projects to help reduce the environmental impact of its operations.

- A new $115 million coker gas plant removes both sulfur and light hydrocarbon compounds from the gas produced in the coker units. This process results in fewer emissions from the refinery’s furnaces and optimizes the quantity of fuel burned.

- An $18 million project at both coker units reduces the amount of hydrocarbons released during a cleaning process.

- “Our number one goal on our safety journey is that everyone goes home safely every day,” says Refinery Manager Des Gillen. “We achieve this by staying mindful of what is going on around us and asking everyone on site to act as a safety leader every day.”

- The Toledo Refinery helps cultivate America’s next generation of engineers and technicians through partnerships with a variety of educational programs and institutions, ranging from kindergarten to higher education.

- For example, it sponsors scholarships with the University of Toledo to give local students the opportunity to pursue engineering. Over the past decades, BP has also contributed over $500,000 to downtown Toledo’s nonprofit Imagination Station science museum.

The Toledo Refinery is operated by BP as part of a joint venture with Husky Energy. It has been a significant factor in the strength of the northern Ohio economy since the day it processed its first barrel of oil.

The refinery has provided jobs and economic security for thousands of people; in some cases, two or three generations of families have made their careers at the facility. The entire refinery team is focused on safe operations.

“Marking a century of operations in 2019, the BP-Husky Toledo Refinery is focused on safety, efficiency and sustainability as it looks ahead to the next chapter in its long history.”
Since completing a $200 million investment program in 2017, BP’s Cooper River Chemicals plant has reduced its electricity use and carbon dioxide emissions, while increasing its total output of purified terephthalic acid (PTA).

More specifically, the project has allowed Cooper River to reduce the amount of electricity it purchases from the grid by almost 40 percent and cut carbon dioxide emissions by up to 110,000 tons per year.

Cooper River also offers the U.S. plastics industry PTAir Neutral, the world’s first certified carbon-neutral PTA. Underpinned by proprietary para-xylene and PTA technologies, PTAir Neutral uses programs such as reforestation and fuel-efficient cookstove projects to offset and neutralize 100 percent of CO₂e emissions during the PTA manufacturing process, helping customers achieve their sustainability targets.

“Our upgrades have allowed us to continue a path of operating safely and productively, while helping us lower our energy consumption and reduce our product cost,” says Plant Manager John Harvey. “We’re seeing the ability of the plant to be more competitive while improving our cost position.”

Cooper River is America’s largest producer of PTA, a BP-invented feedstock that is the building block for thousands of everyday items, ranging from clothing and carpets to computer screens and food packaging.

Cooper River’s safety efforts have earned it the South Carolina Chamber of Commerce Workplace Safety Award five years in a row.

Since completing a $200 million investment program in 2017, BP’s Cooper River Chemicals plant has reduced its electricity use and carbon dioxide emissions, while increasing its total output of purified terephthalic acid (PTA).

More specifically, the project has allowed Cooper River to reduce the amount of electricity it purchases from the grid by almost 40 percent and cut carbon dioxide emissions by up to 110,000 tons per year.

Cooper River also offers the U.S. plastics industry PTAir Neutral, the world’s first certified carbon-neutral PTA. Underpinned by proprietary para-xylene and PTA technologies, PTAir Neutral uses programs such as reforestation and fuel-efficient cookstove projects to offset and neutralize 100 percent of CO₂e emissions during the PTA manufacturing process, helping customers achieve their sustainability targets.

“Our upgrades have allowed us to continue a path of operating safely and productively, while helping us lower our energy consumption and reduce our product cost,” says Plant Manager John Harvey. “We’re seeing the ability of the plant to be more competitive while improving our cost position.”

Cooper River is America’s largest producer of PTA, a BP-invented feedstock that is the building block for thousands of everyday items, ranging from clothing and carpets to computer screens and food packaging.

Cooper River’s safety efforts have earned it the South Carolina Chamber of Commerce Workplace Safety Award five years in a row.

Environmental leadership

Located on the outskirts of Charleston, South Carolina, Cooper River’s production facilities are surrounded by dense forests and wetlands featuring a rich ecosystem of plants and animals indigenous to the Lowcountry. The area serves as a vast outdoor classroom and nature preserve for local schools and community organizations, such as search-and-rescue dog training teams and veterans’ groups.

A $200 million modernization project has enabled BP’s Cooper River Chemicals plant to significantly reduce its energy use and carbon dioxide emissions.
BP’s Texas City Chemicals (TCC) plant is a leading producer of both metaxylene (MX) and paraxylene (PX), chemical compounds that help make everything from clothes and carpets to smartphones and surfboards. Located about 60 miles southeast of BP’s U.S. headquarters in Houston, TCC has three process units and a deepwater marine terminal.

In 2017, the plant completed a major investment project that expanded the facility, significantly improved its operational efficiency and increased its production of MX by 10 percent.

“Today’s petrochemicals industry continues to be extremely competitive, and BP has always worked to deliver quality products while prioritizing safety, innovation and caring for our environment,” says Plant Manager Pete Nowobilski. “Everything we do relies upon the safety of our operations, our workforce and the communities around us — and we are committed to continuous safety improvement.”

Advantaged manufacturing

The plant buys hydrocarbon mixtures called “xylenes” from Gulf Coast refineries, and it uses them to manufacture PX and MX.

- TCC delivers much of its PX output to BP’s Cooper River facility in South Carolina, which in turn manufactures purified terephthalic acid (PTA), a chemical feedstock mainly used to make polyester products.
- Meanwhile, TCC sells its MX output to other manufacturers, which use it to make an array of plastic products, including fiberglass auto bodies, cooling fans, electronic connectors and upholstery.

The plant began operating more than half a century ago, and today it is part of BP’s global aromatics business. Committed to safe and reliable operations, TCC has received the Distinguished Safety Silver Award for top industry safety performance from the American Fuel & Petrochemical Manufacturers association.

Elsewhere in Texas City, BP continues to partner with Eastman Chemical Company on the production and marketing of acetic acid, used to make household fabrics, laundry detergent and other everyday items. In fact, BP is the exclusive marketer of Eastman’s annual output, which can reach around 580,000 tons.

Giving back

TCC makes significant contributions, not only to the southeast Texas economy, but also to local schools and regional community groups. For example, TCC employees volunteer for and donate to organizations such as the United Way and Junior Achievement. Over the past seven years, they have contributed more than 20,000 volunteer hours to community service initiatives.

In numbers

- BP’s Texas City Chemicals plant can produce more than 1.7 million tons of chemicals each year.
- Texas City Chemicals can produce enough paraxylene each year to make seat belts for 1.1 billion cars.
- BP supports more than 21,100 jobs in Texas.

BP supports more than 21,100 jobs in Texas.

Following a major expansion project in 2017, BP’s Texas City Chemicals plant has created a stronger, more flexible business that will continue to meet the requirements and changing needs of its customers.

BP’s Texas City Chemicals (TCC) plant is a leading producer of both metaxylene (MX) and paraxylene (PX), chemical compounds that help make everything from clothes and carpets to smartphones and surfboards.

Located about 60 miles southeast of BP’s U.S. headquarters in Houston, TCC has three process units and a deepwater marine terminal.

In 2017, the plant completed a major investment project that expanded the facility, significantly improved its operational efficiency and increased its production of MX by 10 percent.

“Today’s petrochemicals industry continues to be extremely competitive, and BP has always worked to deliver quality products while prioritizing safety, innovation and caring for our environment,” says Plant Manager Pete Nowobilski. “Everything we do relies upon the safety of our operations, our workforce and the communities around us — and we are committed to continuous safety improvement.”

Advantaged manufacturing

The plant buys hydrocarbon mixtures called “xylenes” from Gulf Coast refineries, and it uses them to manufacture PX and MX.

- TCC delivers much of its PX output to BP’s Cooper River facility in South Carolina, which in turn manufactures purified terephthalic acid (PTA), a chemical feedstock mainly used to make polyester products.
- Meanwhile, TCC sells its MX output to other manufacturers, which use it to make an array of plastic products, including fiberglass auto bodies, cooling fans, electronic connectors and upholstery.

The plant began operating more than half a century ago, and today it is part of BP’s global aromatics business. Committed to safe and reliable operations, TCC has received the Distinguished Safety Silver Award for top industry safety performance from the American Fuel & Petrochemical Manufacturers association.

Elsewhere in Texas City, BP continues to partner with Eastman Chemical Company on the production and marketing of acetic acid, used to make household fabrics, laundry detergent and other everyday items. In fact, BP is the exclusive marketer of Eastman’s annual output, which can reach around 580,000 tons.

Giving back

TCC makes significant contributions, not only to the southeast Texas economy, but also to local schools and regional community groups. For example, TCC employees volunteer for and donate to organizations such as the United Way and Junior Achievement. Over the past seven years, they have contributed more than 20,000 volunteer hours to community service initiatives.

In numbers

- BP’s Texas City Chemicals plant can produce more than 1.7 million tons of chemicals each year.
- Texas City Chemicals can produce enough paraxylene each year to make seat belts for 1.1 billion cars.
- BP supports more than 21,100 jobs in Texas.

Committed to safe and reliable operations, TCC has received the Distinguished Safety Silver Award for top industry safety performance from the American Fuel & Petrochemical Manufacturers association.

Elsewhere in Texas City, BP continues to partner with Eastman Chemical Company on the production and marketing of acetic acid, used to make household fabrics, laundry detergent and other everyday items. In fact, BP is the exclusive marketer of Eastman’s annual output, which can reach around 580,000 tons.

Giving back

TCC makes significant contributions, not only to the southeast Texas economy, but also to local schools and regional community groups. For example, TCC employees volunteer for and donate to organizations such as the United Way and Junior Achievement. Over the past seven years, they have contributed more than 20,000 volunteer hours to community service initiatives.

In numbers

- BP’s Texas City Chemicals plant can produce more than 1.7 million tons of chemicals each year.
- Texas City Chemicals can produce enough paraxylene each year to make seat belts for 1.1 billion cars.
- BP supports more than 21,100 jobs in Texas.
BP Ventures focuses its investments on five areas that are core to BP’s strategy for advancing the energy transition:

- bio and low-carbon products
- carbon management
- power and storage
- advanced mobility
- digital transformation.

“Venturing plays a key role in BP’s strategy to tackle the dual challenge of meeting the world’s need for more energy, while at the same time reducing carbon emissions,” says David Hayes, managing director of the Americas region for BP Ventures. “We invest in small high-tech companies to help accelerate and commercialize new technologies, products and business models.”

Accelerating innovation

For example, BP’s $30 million investment in Calysta supports the company’s strategy of creating new markets in which natural gas can play a significant role in delivering a more sustainable future. It also establishes a strategic relationship between BP and the California-based startup around gas and power supply. BP also has invested $55 million in Fulcrum BioEnergy, a California-based company that produces low-carbon “biojet” fuel from household waste. In 2018, Fulcrum began building a new plant in Nevada that will process around 175,000 tons of garbage a year, turning it into about 11 million gallons of fuel — enough for more than 180 roundtrip flights between London and New York.

Meanwhile, BP’s investment in Solidia, a cement and concrete company based in New Jersey, supports a technology that can produce cement with significantly fewer greenhouse gas emissions. This technology has the potential to reduce emissions in concrete production by up to 70 percent, and it allows 80 percent of the water used in the production process to be recycled.

BP also has invested $5 million in Belmont Technology, a Houston startup that has developed a cloud-based geoscience platform using artificial intelligence. The investment supports BP’s ongoing work exploring opportunities to apply machine learning and cognitive computing in its global oil and gas business.

The mobility future

As part of its focus on advanced mobility, BP has invested in Peloton, a California-based vehicle technology company dedicated to improving the safety and efficiency of freight transportation. Peloton’s technology enables two or more trucks to travel closely but safely together. This reduces aerodynamic drag, generating savings in fuel use and carbon dioxide emissions.

In 2018, BP announced a $5 million investment in FreeWire, a manufacturer of mobile electric vehicle rapid-charging systems based in California. It also announced a $500,000 investment in several members of Incubatenergy, a U.S.-based consortium of clean energy incubators and accelerators.

Globally, BP plans to invest around $200 million each year to help incubate and grow lower-carbon solutions.

In numbers

Since 2006, BP Ventures has invested more than $420 million in dozens of U.S. companies, including eight alternative energy companies.

BP has invested $30 million in Calysta, an alternative protein producer that will use BP’s natural gas to produce protein for fish, livestock and pet feeds.

BP Ventures has made an investment of $5 million in Belmont Technology to further strengthen BP’s artificial intelligence and digital capabilities in its upstream business.

In numbers

Since 2006, BP Ventures has invested more than $420 million in dozens of U.S. companies, including eight alternative energy companies.

BP has invested $30 million in Calysta, an alternative protein producer that will use BP’s natural gas to produce protein for fish, livestock and pet feeds.

BP Ventures has made an investment of $5 million in Belmont Technology to further strengthen BP’s artificial intelligence and digital capabilities in its upstream business.

Additional Businesses

Through its venturing arm, BP helps create and support new low-carbon businesses and promising technologies.
BP is the largest supplier of renewable natural gas (RNG) — or “biogas” — to the U.S. transportation sector. The company’s joint venture with Aria Energy captures methane from landfill waste to produce RNG. Thanks to this partnership, BP now owns RNG production facilities in Michigan, Oklahoma and Tennessee.

“As a global energy business, we are focused on the dual challenge of providing more energy with fewer emissions,” says Janet Kong, head of BP’s oil, products and low-carbon trading business in Chicago. “Part of that commitment includes supporting a range of technologies that will help us transition to a lower-carbon future.”

BP also helps enable projects that reduce or store greenhouse gases and generate environmental credits for use in carbon markets.

For example, BP has worked with the Sealaska Corporation, a Native institution, on an improved forest management project in Alaska to maintain and improve carbon sequestration. In March 2018, more than 9 million carbon offsets were issued to the project.

BP is also actively preparing for new maritime pollution requirements that will significantly reduce the limit on sulfur content in marine fuels globally. The company is undertaking a rigorous testing program to support its customers across the industry in meeting the new regulations.

Gas and power

BP is one of North America’s top wholesale and retail power marketers and the largest natural gas marketer in the region. This represents a crucial part of its broader strategy to advance the energy transition, since gas can dramatically reduce carbon dioxide emissions in the power sector.

“We are continuing to expand our gas and power businesses both domestically and globally,” says Orlando Alvarez, head of BP’s gas, natural gas liquids, and power marketing and trading business in Houston. “We have deep expertise across each of the respective commodity value chains, which allows us to provide the reliability and service our customers expect.”

Keeping energy moving

Because its marketing and trading team is integrated with the rest of the company, BP can maximize the value of its energy resources. For example, the team is responsible for moving what is produced by BPX Energy from its newly acquired assets in the Permian-Delaware and Eagle Ford basins in Texas, and the Haynesville basin in Texas and Louisiana.

BP has garnered recognition for its marketing and trading expertise and has received several industry awards, including:

- Energy Risk “Oil and Products House of the Year” 2019
- Energy Risk “Deal of the Year” 2019

In numbers

BP is the largest marketer of natural gas in North America, selling more than 20 billion cubic feet each day, enough each year to heat every home in the U.S. for nearly two years.

In an average year, BP’s marketing and trading business serves more than 3,500 customers across North America.

BP manages more than 11 billion cubic feet of transportation capacity and schedules gas flows on more than 140 pipelines across North America.

BP is the largest supplier of renewable natural gas (RNG) — or “biogas” — to the U.S. transportation sector. The company’s joint venture with Aria Energy captures methane from landfill waste to produce RNG. Thanks to this partnership, BP now owns RNG production facilities in Michigan, Oklahoma and Tennessee.

“As a global energy business, we are focused on the dual challenge of providing more energy with fewer emissions,” says Janet Kong, head of BP’s oil, products and low-carbon trading business in Chicago. “Part of that commitment includes supporting a range of technologies that will help us transition to a lower-carbon future.”

BP also helps enable projects that reduce or store greenhouse gases and generate environmental credits for use in carbon markets.

For example, BP has worked with the Sealaska Corporation, a Native institution, on an improved forest management project in Alaska to maintain and improve carbon sequestration. In March 2018, more than 9 million carbon offsets were issued to the project.
Wind Energy

In 2018, the electricity generated by BP’s net U.S. wind portfolio did not create around 2 million metric tons of carbon dioxide emissions that would have been created if that electricity had been produced by other available sources, such as coal.¹

The carbon dioxide emissions that would have been released by other available generation sources is roughly equivalent to the annual energy-related emissions of 240,000 typical homes; the emissions produced by burning 2.2 billion pounds of coal; or the emissions produced by consuming 227 million gallons of gasoline.

Improving efficiency
BP is developing and implementing new technologies to help its wind business improve the efficiency of its operations.

- For example, the company introduced predictive analytics to better understand the life span of turbine components at its wind farms.

- By analyzing this data, BP will be able to improve its maintenance schedules, reduce costs and avoid breakdowns.

Working with Tesla, BP is testing how effectively wind energy can be stored at its Titan 1 wind farm in South Dakota. The high-storage battery technology stores excess energy that can then be used across the site when the wind isn’t blowing. The project will help BP learn more about energy storage applications that could be useful across its entire portfolio.

“Investing in these new technologies is part of our strategic efforts to enhance the safety and reliability of our operations,” says BP Wind Energy CEO Al Vickers.

“We continue to optimize our business to find new ways to deliver power more efficiently.”

A key wind energy producer
The company operates nine wind farms in Colorado, Idaho, Indiana, Kansas, Pennsylvania and South Dakota, and holds an interest in a separate wind facility in Hawaii.

In numbers
BP is one of the largest operators of renewable energy businesses among its peers, operating nine onshore wind farms across six states while holding an interest in a separate wind facility in Hawaii.

BP's U.S. wind farms have a gross generating capacity of about 1,679 megawatts.

BP’s wind farms produce enough electricity to power over 450,000 homes, making BP a key wind energy producer in the U.S.

BP provides renewable power through its significant interests in onshore wind energy in the United States, while developing and deploying new technologies to deliver that energy more efficiently.

Its largest wind energy site 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.

Every BP-operated wind farm receives round-the-clock support from on-site personnel and/or BP’s Remote Operating Center (ROC) in Houston. Using advanced technology, ROC teams centrally monitor all BP sites while working with colleagues in the field to enhance performance, reliability and safety. An embedded alarm system immediately notifies operators of potential problems, such as approaching storms or flash flood warnings.

BP works hard to prevent its wind operations from affecting the wildlife and habitats that surround its facilities. For example, it voluntarily adjusts the movement of wind turbines to reduce their impact on bat populations during peak migration seasons.

1 This figure represents the estimated additional greenhouse gas emissions that would have been created if the electricity generated at wind farms in which BP holds an interest had been produced by other available generation sources.
Located in the heart of the biotech community in San Diego, BP’s Biosciences Center (BSC) studies how bioscience can deliver technology solutions to business challenges, add value to BP’s businesses and make them more sustainable.

The BSC team — consisting of dozens of scientists who have cross-disciplinary capabilities in biological sciences, chemical engineering and chemistry — works across BP, supporting many aspects of its operations. This includes the production of renewable energy, oil and natural gas, along with the development of innovative and efficient fuels, lubricants and bio-based products.

A lower-carbon future
The BSC supports BP’s strategy to help the world transition to a low-carbon energy future by:

- solving technical problems that involve biology
- providing guidance on the role of biotechnology in BP’s operations
- monitoring and evaluating disruptive technology
- developing sustainable technology options for business growth

“Biotechnology is a new tool for BP, and we are only beginning to explore its potential,” says Dr. Angelo Amorelli, vice president of group research. “At the BSC, we believe we have created a differentiated biotechnology capability that can deliver value to existing BP businesses and support BP’s longer-term strategies.”

Biotechnology in energy
BP believes biotechnology has the potential to significantly affect the economics and environmental impact of the energy sector.

For example, biotechnology applications in oil and gas production include areas such as enhanced oil recovery, souring control, wastewater treatment and remediation. Advances in these areas can improve the commercial viability of a reservoir and the environmental performance of the extraction process.

The BSC also provides engineering support to BP’s biofuels business, which produces ethanol from sugarcane in Brazil. This type of ethanol has lifecycle greenhouse gas emissions that are about 70 percent lower than conventional transportation fuels.

Meanwhile, the BSC provides specialist advice to Butamax®, BP’s joint venture with DuPont. The Butamax technology converts sugars from corn into an energy-rich biofuel known as bio-isobutanol, which can be blended with gasoline at higher concentrations than ethanol and transported through existing fuel pipelines and infrastructures.

Third-party research
Beyond its lab and business work, the BSC team works with world-class research programs based at UC Berkeley, Lawrence Berkeley National Laboratory and the University of Illinois at Urbana-Champaign, among other institutions.

1 Butamax® is a registered trademark of Du Pont Biofuels U.S.
BP continues to expand its retail presence, with nearly 230 BP- or Amoco-branded stations joining the company’s network in 2018.

In support of its retail growth plans, BP created a joint venture with private equity firm ArcLight Capital Partners, which purchased Kentucky-based fuels retailer Thorntons. The deal closed in February 2019 and included 191 stores in six states. A new Thorntons travel center opened in Indiana in July 2019, marking the first store opening since the formation of the joint venture.

Smarter service
BP continues to make investments in new technology that helps improve the consumer experience.

“Smartphones have shifted consumer behaviors and expectations, compelling us to simplify the shopping experience and allowing us to engage on a more personal level with our consumers,” says Richard Harding, senior vice president of marketing and sales for BP’s North American fuels business.

With the U.S. launch of the new BPme mobile app in 2019, consumers can pay for fuel on their phones at BP and Amoco stations and participate in a loyalty program.

BP helps consumers save on fuel through key retail partnerships. For example, consumers in select areas can earn fuel discounts by shopping at certain Kroger-owned brands, including Mariano’s and Harris Teeter.

Advanced fuels
BP’s portfolio of products includes advanced fuels that help improve engine efficiency. In 2016, BP launched a new version of its leading fuel brand, BP gasoline with Invigorate, which uses an innovative formula to help remove dirt from car engines and give consumers more miles per tank.1

World-class lubricants
Meanwhil, the company markets products made by Castrol, BP’s world-class lubricants business, which is America’s top motor oil brand for consumers who change their own oil.

Internationally renowned for its pioneering technologies, Castrol has facilities nationwide, including manufacturing sites in Louisiana, Maryland and Pennsylvania. Its U.S. headquarters is located in Wayne, New Jersey.

The business is developing several next-generation lubricants, including:

- advanced, low-viscosity fluids that can improve the efficiency of existing transport and industrial systems, reducing emissions in the process
- novel fluids to lubricate immersed (wet) electric motors, providing enhanced power and efficiency in battery electric vehicles
- battery coolants, which will be required to support fast charging technologies.

1 Dirt refers to deposits on critical engine parts. Compared to traditional detergent gasoline, BP gasoline with Invigorate can clean out 3.5X more dirt per tankful. Results may vary depending on your vehicle and driving conditions.

From coast to coast, BP provides Americans with fuels, lubricants and other products essential to modern transportation, including a growing number of lower-carbon and carbon-neutral products.
In addition to the thousands of miles of pipelines it manages, BP also has an ownership stake in close to 1,500 miles of additional pipelines. This combined network is long enough to stretch from Chicago to London.

**Delivering energy across America**

In 2017, BP’s U.S. Pipelines and Logistics (USPL) business formed a new master limited partnership — BP Midstream Partners LP (BPMP) — and completed the first initial public offering in BP history.

The BPMP assets include pipelines that transport onshore crude oil production to BP’s Whiting Refinery in northwest Indiana and offshore crude oil and natural gas production to key refining markets and trading and distribution hubs. USPL continues to manage the BPMP assets with BP employees.

“Americans rely on the pipelines operated by BP to safely and reliably provide the energy that fuels their daily lives,” says Clive Christison, vice president of pipelines, supply and optimization for BP’s North American fuels business. “Our extensive network of pipes keeps the country running, providing the energy for the electricity and fuel that power the vehicles, airplanes and machines that make modern life possible.”

USPL operates the 400-mile Olympic Pipeline, which moves gasoline, diesel and jet fuel from four Puget Sound refineries, including BP’s Cherry Point Refinery, to seven intermediate delivery sites and 17 terminals in the Pacific Northwest. It transports more than 12 million gallons of fuel each day, meaning it effectively does the work of around 1,400 tanker trucks.

Headquartered in Chicago, BP’s pipeline operations are managed from control centers in Oklahoma and Washington. Employees at these facilities use satellite communications and other innovative technologies, including a state-of-the-art leak detection system and an industry-leading damage prevention program, to help BP’s operations run safely and efficiently.

**Commitment to safety**

USPL is committed to continuous safety improvement — a commitment that the American Petroleum Institute recognized with its Occupational Safety Performance Award for large operators in 2016, the last year the award was granted. Every day, the USPL team works hard to systematically and effectively manage safety, which is central to its business operations.

Beyond the pipelines and terminals that USPL operates directly, BP also has an ownership interest in more than a dozen additional terminals in California, Georgia, Illinois, Indiana, Maryland, Minnesota, New Jersey, New York, Ohio, Oregon and Washington.
BP’s new state-of-the-art liquefied natural gas (LNG) tankers are the most fuel-efficient and technically advanced LNG tankers ever built for BP. While the ships are bigger, more powerful and have a much larger carrying capacity than their predecessors, they’re also more efficient, environmentally friendly and cost effective.

In the United States, the vessels will service BP’s 20-year liquefaction contract with the LNG terminal in Freeport, Texas.

Better, safer, cleaner

The ships feature hull designs that make them faster and easier to maneuver, and they are fitted with reliquefaction plants, which can turn evaporated natural gas back into LNG. This is then pumped back to the cargo tanks, allowing the ships to deliver more LNG to the market.

Each vessel is equipped with an exhaust gas recirculation system that reduces nitrogen oxide emissions. Meanwhile, the gas combustion system onboard the new LNG tankers minimizes the risk of methane releases to the atmosphere.

“BP continues to expand the reach of our LNG business and serve our customers with flexible solutions by leveraging our scale, integration and relationships,” says BP Shipping’s Head of Global Business Partnership Lambros Klaoudatos. “At the same time, we remain committed to safe and reliable operations while also contributing to the dual challenge of providing more energy to market with fewer emissions.”

Safety at sea

BP Shipping works hard to monitor the safety of its own vessels, as well as the safety of third-party vessels moving BP cargoes.

• BP teams rigorously assess vessels based on a range of criteria, including management, operational, crewing and structural standards.
• In 2019, the Chamber of Shipping of America recognized the crews of 10 BP vessels for their excellent safety performance, honoring them with the prestigious Jones F. Devlin Award. To receive the award, a merchant marine vessel must operate for at least two years without a crew member losing a full turn at watch due to an occupational injury.

Alaska Tanker Company

BP also owns a 25 percent stake in the Alaska Tanker Company (ATC), which consolidates its Alaskan crude oil shipping requirements into one operating company. ATC’s four tankers deliver crude oil from the Valdez Marine Terminal in southeast Alaska to facilities on the West Coast and in Hawaii.

In numbers

BP Shipping completed about 1,600 voyages and moved more than 60 million metric tons of cargo to or from U.S. ports in 2018.

BP’s shipping business built 26 new product and crude tankers that are over 20 percent more fuel efficient than its previous generation tankers.

It also took delivery of six new liquefied natural gas vessels that will be roughly 25 percent more fuel efficient than their predecessors.

With the addition of six new fuel-efficient and technically advanced liquefied natural gas tankers to its fleet, BP’s shipping business supports the company’s strategy to reduce its carbon emissions and grow its natural gas portfolio.
Contact details

BP America
Communications & External Affairs
Westlake One
501 Westlake Park Blvd.
Houston, TX 77079-2696
uspress@bp.com

Cautionary statement

No part of this U.S. Economic Impact Report 2019 constitutes, or shall be taken to constitute, an invitation or inducement to invest in BP p.l.c. or any other entity and must not be relied upon in any way in connection with any investment decisions. BP p.l.c. is the parent company of the BP group of companies. Unless otherwise stated, the text does not distinguish between the activities and operations of the parent company and those of its subsidiaries.

BP disclaims any obligation to update this publication. Neither BP p.l.c., nor any of its subsidiaries, accepts liability for any inaccuracies or omissions or for any direct, indirect, special, consequential or other losses or damages of whatsoever kind in connection to this publication or any information contained in it.