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.

**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, BP is evaluating and piloting new digital inspection technologies to enhance its ability to monitor undersea equipment more thoroughly, but at lower risk to the people who do the work.

**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.