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U.S. Inches Toward Goal of Energy Independence

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MIDLAND, Tex. — The desolate stretch of West Texas desert known as the Permian Basin is still the lonely domain of scurrying roadrunners by day and howling coyotes by night. But the roar of scores of new oil rigs and the distinctive acrid fumes of drilling equipment are unmistakable signs that crude is gushing again.

And not just here. Across the country, the oil and gas industry is vastly increasing production, reversing two decades of decline. Using new technology and spurred by rising oil prices since the mid-2000s, the industry is extracting millions of barrels more a week, from the deepest waters of the Gulf of Mexico to the prairies of North Dakota.

At the same time, Americans are pumping significantly less gasoline. While that is partly a result of the recession and higher gasoline prices, people are also driving fewer miles and replacing older cars with more fuel-efficient vehicles at a greater clip, federal data show.

Taken together, the increasing production and declining consumption have unexpectedly brought the United States markedly closer to a goal that has tantalized presidents since Richard Nixon: independence from foreign energy sources, a milestone that could reconfigure American foreign policy, the economy and more. In 2011, the country imported just 45 percent of the liquid fuels it used, down from a record high of 60 percent in 2005.

"There is no question that many national security policy makers will believe they have much more flexibility and will think about the world differently if the United States is importing a lot less oil," said Michael A. Levi, an energy and environmental senior fellow at the Council on Foreign Relations.

Jim Wilson/The New York Times - An Apache Corporation well near Hobbs, N.M. Apache is drilling in the Permian Basin, an oil field once thought played out

"For decades, consumption rose, production fell and imports increased, and now every one of those trends is going the other way."

How the country made this turnabout is a story of industry-friendly policies started by President Bush and largely continued by President Obama — many over the objections of environmental advocates — as well as technological advances that have allowed the extraction of oil and gas once considered too difficult and too expensive to reach. But mainly it is a story of the complex economics of energy, which sometimes seems to operate by its own rules of supply and demand.

With gasoline prices now approaching record highs and politicians mud-wrestling about the causes and solutions, the effects of the longer-term rise in production can be difficult to see.

Simple economics suggests that if the nation is producing more energy, prices should be falling. But crude oil — and gasoline and diesel made from it — are global commodities whose prices are affected by factors around the world. Supply disruptions in Africa, the political standoff with Iran and rising demand from a recovering world economy all are contributing to the current spike in global oil prices, offsetting the impact of the increased domestic supply.

But the domestic trends are unmistakable. Not only has the United States reduced oil imports from members of the Organization of the Petroleum Exporting Countries by more than 20 percent in the last three years, it has become a net exporter of refined petroleum products like gasoline for the first time since the Truman presidency. The natural gas industry, which less than a decade ago feared running out of domestic gas, is suddenly dealing with a glut so vast that import facilities are applying for licenses to export gas to Europe and Asia.

National oil production, which declined steadily to 4.95 million barrels a day in 2008 from 9.6 million in 1970, has risen over the last four years to nearly 5.7 million barrels a day. The Energy Department projects that daily output could reach nearly seven million barrels by 2020. Some experts think it could eventually hit 10 million barrels — which would put the United States in the same league as Saudi Arabia.

This surge is hardly without consequences. Some areas of intense drilling activity, including northeastern Utah and central Wyoming, have experienced air quality problems. The drilling technique called hydraulic fracturing, or fracking, which uses highly pressurized water, sand and chemical lubricants that help force more oil and gas from rock formations, has also been blamed for wastewater problems. Wildlife experts also warn that expanded drilling is threatening habitats of rare or endangered species.

Greater energy independence is "a prize that has long been eyed by oil insiders and policy strategists that can bring many economic and national security benefits," said Jay Hakes, a senior official at the Energy Department during the Clinton administration. "But we will have to work through the environmental issues, which are a definite challenge."

The increased production of fossil fuels is a far cry from the energy plans President Obama articulated as a candidate in 2008. Then, he promoted policies to help combat global warming, including vast investments in renewable energy and a cap-and-trade system for carbon emissions that would have discouraged the use of fossil fuels.

More recently, with gasoline prices rising and another election looming, Mr. Obama has struck a different chord. He has opened new federal lands and waters to drilling, trumpeted increases in oil and gas production and de-emphasized the challenges of climate change. On Thursday, he said he supported expedited construction of the southern portion of the proposed Keystone XL oil pipeline from Canada.

Mr. Obama's current policy has alarmed many environmental advocates who say he has failed to adequately address the environmental threats of expanded drilling and the use of fossil fuels. He also has not silenced critics, including Republicans and oil executives, who accuse him of preventing drilling on millions of acres off the Atlantic and Pacific Coasts and on federal land, unduly delaying the decision on the full Keystone project and diverting scarce federal resources to pie-in-the-sky alternative energy programs.

Just as the production increase was largely driven by rising oil prices, the trend could reverse if the global economy were to slow. Even so, much of the industry is thrilled at the prospects.

"To not be concerned with where our oil is going to come from is probably the biggest home run for the country in a hundred years," said Scott D. Sheffield, chief executive of Pioneer Natural Resources, which is operating in West Texas. "It sort of reminds me of the industrial revolution in coal, which allowed us to have some of the cheapest energy in the world and drove our economy in the late 1800s and 1900s."

The Foundation Is Laid

For as long as roughnecks have worked the Permian Basin — made famous during World War II as the fuel pump that powered the Allies — they have mostly focused on relatively shallow zones of easily accessible, oil-soaked sandstone and silt. But after 80 years of pumping, those regions were running dry.

So in 2003, Jim Henry, a West Texas oilman, tried a bold experiment. Borrowing an idea from a fellow engineer, his team at Henry Petroleum drilled deep into a hard limestone formation using a refinement of fracking. By blasting millions of gallons of water into the limestone, they created tiny fissures that allowed oil to break free, a technique that had previously been successful in extracting gas from shale.

The test produced 150 barrels of oil a day, three times more than normal. "We knew we had the biggest discovery in over 50 years in the Permian Basin," Mr. Henry recalled.

There was just one problem: At $30 a barrel, the price of oil was about half of what was needed to make drilling that deep really profitable.

So the renaissance of the Permian — and the domestic oil industry — would have to wait.

But the drillers in Texas had important allies in Washington. President Bush grew up in Midland and spent 11 years as a West Texas oilman, albeit without much success, before entering politics. Vice President Dick Cheney had been chief executive of the oil field contractor Halliburton. The Bush administration worked from the start on finding ways to unlock the nation's energy reserves and reverse decades of declining output, with Mr. Cheney leading a White House energy task force that met in secret with top oil executives.

"Ramping up production was a high priority," said Gale Norton, a member of the task force and the secretary of the Interior at the time. "We hated being at the mercy of other countries, and we were determined to change that."

The task force's work helped produce the Energy Policy Act of 2005, which set rules that contributed to the current surge. It prohibited the Environmental Protection Agency from regulating fracking under the Safe Drinking Water Act, eliminating a potential impediment to wide use of the technique. The legislation also offered the

By 2008, daily global oil consumption surged to 86 million barrels, up nearly 20 percent from the decade before. In July of that year, the price of oil reached its highest level since World War II, topping $145 a barrel (equivalent to more than $151 a barrel in today's dollars).

Oil reserves once too difficult and expensive to extract — including Mr. Henry's limestone fields — had become more attractive.

If money was the motivation, fracking became the favored means of extraction.

While fracking itself had been around for years, natural gas drillers in the 1980s and 1990s began combining high-pressure fracking with drilling wells horizontally, not just vertically. They found it unlocked gas from layers of shale previously seen as near worthless.

By 2001, fracking took off around Fort Worth and Dallas, eventually reaching under schools, airports and inner-city neighborhoods. Companies began buying drilling rights across vast shale fields in a variety of states. By 2008, the country was awash in natural gas.

Fracking for oil, which is made of larger molecules than natural gas, took longer to develop. But eventually, it opened new oil fields in North Dakota, South Texas, Kansas, Wyoming, Colorado and, most recently, Ohio.

Meanwhile, technological advances were making deeper oil drilling possible in the Gulf of Mexico. New imaging and seismic technology allowed engineers to predict the location and size of reservoirs once obscured by thick layers of salt. And drill bits made of superstrong alloys were developed to withstand the hot temperatures and high pressures deep under the seabed.

As the industry's confidence — and profits — grew, so did criticism. Amid concerns about global warming and gasoline prices that averaged a record $4.11 a gallon in July 2008 ($4.30 in today's dollars), President Obama campaigned on a pledge to shift toward renewable energy and away from fossil fuels.

His administration initially canceled some oil and gas leases on federal land awarded during the Bush administration and required more environmental review. But in a world where crucial oil suppliers like Venezuela and Libya were unstable and high energy prices could be a drag on a weak economy, he soon acted to promote more drilling. Despite a drilling hiatus after the 2010 explosion of the Deepwater Horizon in the Gulf of Mexico, which killed 11 rig workers and spilled millions of barrels of crude oil into the ocean, he has proposed expansion of oil production both on land and offshore. He is now moving toward approving drilling off the coast of Alaska. "Our dependence on foreign oil is down because of policies put in place by our administration, but also our predecessor's administration," Mr. Obama said during a campaign appearance in March, a few weeks after opening 38 million more acres in the gulf for oil and gas exploration. "And whoever succeeds me is going to have to keep it up."

An American Oil Boom

The last time the Permian Basin oil fields enjoyed a boom — nearly three decades ago — Rolls-Royce opened a showroom in the desert, Champagne was poured from cowboy boots, and the local airport could not accommodate all the Learjets taking off for Las Vegas on weekends.

But when crude prices fell in the mid-1980s, oil companies pulled out and the Rolls dealership was replaced by a tortilla factory. The only thriving business was done by bankruptcy lawyers and auctioneers helping to unload used Ferraris, empty homes and useless rigs.

"One day we were rolling in oil," recalled Jim Foreman, the general manager of the Midland BMW dealership, "and the next day geologists were flipping burgers at McDonald's."

The burger-flipping days are definitely over. Today, more than 475 rigs — roughly a quarter of all rigs operating in the United States — are smashing through tight rocks across the Permian in West Texas and southeastern New Mexico. Those areas are already producing nearly a million barrels a day, or 17 percent more than two years ago. By decade's end, that daily total could easily double, oil executives say, roughly equaling the total output of Nigeria.

"We're having a revolution," said G. Steven Farris, chief executive of Apache Corporation, one of the basin's most active producers. "And we're just scratching the surface."

It is a revolution that is returning investments to the United States. Over several decades, Pioneer Natural Resources had taken roughly $1 billion earned in Texas oil fields

and drilled in Africa, South America and elsewhere. But in the last five years, the company sold $2 billion of overseas assets and reinvested in Texas shale fields.

"Political risk was increasing internationally," said Mr. Sheffield, Pioneer's chief executive, and domestically, he was encouraged to see "the shale technology progressing."

Pioneer's rising fortunes can be seen on a 10,000-acre field known as the Giddings Estate, a forsaken stretch inhabited by straggly coyotes, rabbits, rattlesnakes and cows that forage for grass between the sagebrush. When Pioneer bought it in 2005, the field's hundred mostly broken-down wells were producing a total of 50 barrels a day. "It was a diamond in the rough," said Robert Hillger, who manages it for Pioneer.

Mr. Hillger and his colleagues have brought an array of new tools to bear at Giddings. Computer programs simulate well designs, minimizing trial and error. Advanced fiber optics allow senior engineers and geologists at headquarters more than 300 miles away to monitor progress and remotely direct the drill bit. Subterranean microphones help identify fissures in the rock to plan subsequent drilling.

Today, the Giddings field is pumping 7,000 barrels a day, and Pioneer expects to hit 25,000 barrels a day by 2017.

The newfound wealth is spreading beyond the fields. In nearby towns, petroleum companies are buying so many pickup trucks that dealers are leasing parking lots the size of city blocks to stock their inventory. Housing is in such short supply that drillers are importing contractors from Houston and hotels are leased out before they are even built.

Two new office buildings are going up in Midland, a city of just over 110,000 people, the first in 30 years, while the total value of downtown real estate has jumped 50 percent since 2008. With virtually no unemployment, restaurants cannot find enough servers. Local truck drivers are making six-figure salaries.

"Anybody who comes in with a driver's license and a Social Security card, I'll give him a chance," said Rusty Allred, owner of Rusty's Oilfield Service Company.

If there is a loser in this boom, it is the environment. Water experts say aquifers in the desert area could run dry if fracking continues expanding, and oil executives concede they need to reduce water consumption. Yet environmental concerns, from polluted air to greenhouse gas emissions, have gained little traction in the Permian Basin or other outposts of the energy expansion.

On the front lines in opposition is Jay Lininger, a 36-year-old ecologist who drives through the Permian in an old Toyota Tacoma with a hard hat tilted on his head and a federal land map at the ready.

A former national park firefighter, he says he is now battling a wildfire of a different sort — the oil industry.

Nationally, environmentalists have challenged drilling with mixed results. Efforts to stop or slow fracking have succeeded in New York State and some localities in other states, but it is spreading across the country.

In the Permian, Mr. Lininger said, few people openly object to the foul-smelling air of the oil fields. Ranchers are more than happy to sell what water they have to the oil companies for fracking.

Mr. Lininger and his group are trying to slow the expansion of drilling by appealing to the United States Fish and Wildlife Service to protect several animal species, including the five-inch dunes sagebrush lizard.

"It's a pathetic little lizard in an ugly desert, but life needs to be protected," he said. "Every day we burn fossil fuel makes it harder for our planet to recover from our energy addiction."

Mr. Lininger said the oil and ranching industries had already destroyed or fragmented 40 percent of the lizard's habitat, and 60 percent of what is left is under lease for oil and gas development.

The wildlife agency proposed listing the lizard as endangered in 2010 and was expected to decide last December, but Congressional representatives from the oil patch won a delay. Oil companies are working on a voluntary program to locate new drilling so it will not disturb the lizard habitat.

But for Mr. Lininger's group, the Center for Biological Diversity, that is far from sufficient.

Brendan Cummings, senior counsel of the center, said protecting the lizard was part of a broader effort to keep drilling from harming animals, including polar bears, walruses and bowhead whales in the Alaskan Arctic and dwarf sea horses and sea turtles in the Gulf of Mexico.

"When you are dealing with fossil fuels, things will always go wrong," Mr. Cummings said. "There will always be spills, there will always be pollution. Those impacts compound the fragmentation that occurs and render these habitats into sacrifice areas."

A Turn Toward Efficiency

If the Permian Basin exemplifies the rise in production, car-obsessed San Diego is a prime example of the other big factor in the decline in the nation's reliance on foreign oil.

Just since 2007, consumption of all liquid fuels in the United States, including diesel, jet fuel and heating oil, has dropped by about 9 percent, according to the Energy Department. Gasoline use fell 6 to 12 percent, estimated Tom Kloza, chief oil analyst at the Oil Price Information Service.

Although Southern California's love affair with muscle cars and the open road persists, driving habits have changed in subtle but important ways.

Take Tory Girten, who works as an emergency medical technician and part-time lifeguard in the San Diego area. He switched from driving a Ford minivan to a decidedly smaller and more fuel-efficient Dodge Caliber. Fed up with high gasoline prices, he also moved twice recently to be closer to the city center, cutting his daily commute considerably — a hint of the shift taking place in certain metropolitan areas as city centers become more popular while growth in far-out suburbs slows.

"I would rather pay a little more monthly for rent than for just filling up my tank with gas," he said, after pulling into a local gas station to fill up.

Mr. Girten is one of millions of Americans who have downsized. S.U.V.'s accounted for 18 percent of new-car sales in 2002, but only 7 percent in 2010.

The surge in gasoline prices nationwide — they are already at a record level for this time of year — has contributed to the shift toward more fuel-efficient cars. But a bigger factor is rising federal fuel economy standards. After a long freeze, the miles-per-gallon mandate has been increased several times in recent years, with the Obama administration now pushing automakers to hit 54.5 m.p.g. by 2025.

As Americans replace their older cars — they have bought an average of 1.25 million new cars and light trucks a month this year — new technologies mean they usually end up with a more efficient vehicle, even if they buy a model of similar size and power.

California has long pushed further and faster toward efficiency than the rest of the country. It has combated often severe air pollution by mandating cleaner-burning cars, including all-electric vehicles, and prodded Washington to increase the fuel efficiency standards.

Thousands of school buses, trash trucks, tractor-trailers and street sweepers and public transit buses in the state run on natural gas, which is cheaper than gasoline and burns more cleanly. That switch cuts the consumption of foreign oil, as does the corn-based ethanol that is now mixed into gasoline as a result of federal mandates.

Longer-term social and economic factors are also reducing miles driven — like the rise in Internet shopping and telecommuting and the tendency of baby boomers to drive less as they age. The recession has also contributed, as job losses have meant fewer daily commutes and falling home prices have allowed some people to afford to move closer to work.

The trend of lower consumption, when combined with higher energy production, has profound implications, said Bill White, former deputy energy secretary in the Clinton administration and former mayor of Houston.

"Energy independence has always been a race between depletion and technologies to produce more and use energy more efficiently," he said. "Depletion was winning for decades, and now technology is starting to overtake its lead."