Nation/World

Big oil slowly adapts to a warming world

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In a warming world, Big Oil doesn't look quite so big anymore.

A global glut of oil and natural gas has sent prices tumbling over the last two years, and profits are evaporating. Improving auto fuel efficiency standards threaten to depress oil consumption eventually, and fleets of electric vehicles are gradually emerging in China and a few other important markets.

Perhaps most troubling for oil companies over the long term is the goal — agreed to in December by virtually every country in the world at a climate conference in Paris — of staving off a rise in average global temperatures of more than 2 degrees Celsius above preindustrial levels.

Fatih Birol, the executive director of the International Energy Agency, has said that to reach that goal, two-thirds of the global coal, oil and natural gas reserves still underground may never be burned without some improbable technological breakthrough in dealing with the carbon emissions. This position has been echoed by Mark Carney, the governor of the Bank of England.

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The oil industry has experienced global crises, booms and busts for over a century, and few energy experts think it faces an existential threat in the immediate future. The world will still need oil and gas for decades, and normal declines in existing fields oblige further drilling. But change is almost certainly coming.

"Any energy company in the world that makes its strategy without considering climate change policies is making a major mistake," Birol said in an interview, "not only a major mistake for the climate but also for their own profits and for their own shareholders, because climate change policies represent a fundamental challenge to business as usual."

The International Energy Agency's projections of future global oil demand include one possibility in which demand could drop more than 20 percent from today's levels, to 74 million barrels a day by 2040, if measures are put in place to keep global warming at levels proposed at the Paris conference. As coal burning declines precipitously and renewable energy grows steadily, natural gas demand will rise only modestly by 2040 even as the global population grows, if the world truly wants to come to grips with climate change.

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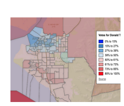

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Not surprisingly, many oil executives view a different path as more likely. Exxon Mobil, for example, projects that global demand for oil will keep growing — by just over 13 percent from today, to 109 million barrels of oil a day by 2040.

At the same time, Exxon Mobil, Royal Dutch Shell and many other companies are investing heavily in natural gas as a lower-carbon answer to growing global energy needs. They view gas as a clean fuel of the future.

"We continue to believe fossil fuels will have a significant and important role to play for as far as we can see," Exxon Mobil's chief executive, Rex W. Tillerson, said at the company's annual shareholders meeting in May.

Which way the world will turn is still in doubt. Most oil executives and independent experts agree that the ambitious Paris target will be challenging to reach, and that reduced burning of fossil fuels will require big technological and policy shifts.

Governments will probably need to be more proactive in deploying nuclear power, which is virtually carbon-free, many experts say.

[Analysis: Big oil's recovery is still some way off as prices stay low]

Coal-fired power plants will need to be equipped with costly carbon capture and sequestration systems. Higher prices for carbon-based fuels are needed in countries like the U.S. to depress demand and encourage investments in nuclear power and carbon capture and sequestration.

Advanced biofuels must be developed to produce renewable fuels without competing with food supplies. Better and cheaper batteries are needed to make electric cars affordable, while recharging stations need to be deployed far more widely.

All those strategies are costly, politically charged or technically challenging. Big scientific breakthroughs will be needed.

Oil companies have tried to offer solutions to remain relevant. Exxon Mobil, for instance, has financed research into carbon capture and sequestration and lobbied for a carbon tax. Shell has been a big investor in Brazilian biofuels, while Chevron has long been one of the biggest investors in geothermal energy. The French oil company Total is making a major effort in solar power.

Several oil and gas companies have already moved quickly to reduce emissions of methane,

a powerful greenhouse gas, from their exploration and transmission operations. Some farsighted executives have even suggested that their natural gas production could eventually be a major source of hydrogen for fuel cells because methane is hydrogen-rich.

But it's just a start. With their scientific and engineering prowess and capital muscle, many oil companies have the capacity to retrofit their business plans if and when they are forced to.

Jeremy Bentham, Royal Dutch Shell's vice president for global business environment, said Shell and other oil companies could adapt and prosper to meet the world's energy needs, which should continue to grow.

"Our portfolio mix would adjust over time," he said, "such that the level of the demand for oil would be met and the level of demand for overall energy would be met."

Bentham acknowledged that the world must leave some fossil fuels in the ground, but that the global community and not just oil companies must take action to reduce demand for carbon-based fuels.

"To have a demand at a much lower level you need a significant restructuring of mobility systems with more compact cities and with more public transport that can be electrified," he said. "You've got to have hydrogen fuel-cell vehicles that can take a longer range — a whole restructuring that isn't driven by energy production."

[With fracking concerns growing in Alaska, group wants public hearings]

The restructuring of a new energy system is years if not decades away, and signs that important change is coming have been uneven.

The electric car market is growing slowly in the U.S. and most of Europe because of high costs and range limitations, although it is advancing faster in China. Toyota, Hyundai and Honda already offer hydrogen fuel-cell cars in select markets, and other companies are testing models that would emit nothing but water from the tailpipe, but major market penetration could be decades away.

Automobiles are becoming far more efficient, although cheap gasoline is causing a surge in consumer demand in the U.S. for pickup trucks and sport utility vehicles.

As for the petroleum industry, there are multiple signs of stress in a world of cheap hydrocarbons and rising environmental concerns. What once looked like a rush to drill for oil and gas in the Arctic has stalled. Investments in Canada's oil sands have slowed, partly as a result of low commodity prices, but also because environmentalists have been successful in opposing the Keystone XL and other pipelines.

Likewise, the hydraulic fracturing revolution that led to a frenzy of drilling in the U.S. is taking off in Argentina, but hardly anywhere else. The collapse in oil and natural gas prices has led to scores of bankruptcies, mounting debts and the slashing of exploration budgets. Attorneys general in several states are investigating charges that Exxon Mobil raised doubts about climate change while its scientists warned about the dangers of carbon emissions.

In this new world, European companies have been relatively more responsive to change. Many have embraced shareholder proposals to acknowledge the need to limit the rise in global temperatures and to test operations to see how they would perform in a carbon-constrained world. Such proposals have mostly been rejected by the American majors.

Statoil, the Norwegian national company, has agreed to accelerate its investments in renewable energy, announcing new investment decisions totaling more than $1 billion. Among these are the world's first floating offshore wind park and one of the world's largest venture funds dedicated to renewables. The projects in Statoil's renewable energy portfolio now have a combined capacity to power more than 1 million European homes.

"We recognize that only a certain amount of CO2 can be emitted to reach the 2-degree target," said Bjorn Otto Sverdrup, Statoil's senior vice president for sustainability. "Then you have to accept the idea of a carbon budget. You need to have ideas that are not only consistent with your organization's goals but also with climate science."

Independent energy experts are either skeptical of or only cautiously optimistic about the will of the oil companies to change.

"Oil companies are moving slowly but surely," Birol of the International Energy Agency said. "Some are moving faster, and some are moving much, much slower, if at all."

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