

[Back to previous page](#)



document 1 of 1



Welcome to the Revolution: Why Shale Is the Next Shale

Morse, Edward L. **Foreign Affairs** 93.3 (May/June 2014): 3-7.

Find a copy



http://sfxhosted.exlibrisgroup.com/nps?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:journal&genre=unknown&sid=ProQ:ProQ%3Aabiglobal&atitle=Welcome+to+the+Revolution%3A+Why+Shale+Is+the+Next+Shale&title=Foreign+Affairs&issn=00157120&date=2014-05-01&volume=93&issue=3&page=3&au=Morse%2C+Edward+L&isbn=&jtitle=Foreign+Affairs&bttitle=&rft_id=info:eric/&rft_id=info:doi/

Abstract (summary)

Despite its doubters and haters, the US shale revolution in oil and gas production is here to stay. In the second half of this decade, moreover, it is likely to spread globally more quickly than most think. And all of that is, on balance, a good thing for the world. There is no longer any doubt about the sheer abundance of this new accessible resource base, and that recognition is leading many governments to accelerate the delineation and development of commercially available resources. Skeptics point to three problems that could lead the fruits of the revolution to be left to wither on the vine: environmental regulation, declining rates of production, and drilling economics. But none is likely to be catastrophic. Since shale resources are found around the globe, many countries are trying to duplicate the US's success in the sector, and it is likely that some, and perhaps many, will succeed.

Full Text

Despite its doubters and haters, the shale revolution in oil and gas production is here to stay. In the second half of this decade, moreover, it is likely to spread globally more quickly than most think. And all of that is, on balance, a good thing for the world.

The recent surge of U.S. oil and natural gas production has been nothing short of astonishing. For the past three years, the United States has been the world's fastest-growing hydrocarbon producer, and the trend is not likely to stop anytime soon. U.S. natural gas production has risen by 25 percent since 2010, and the only reason it has temporarily stalled is that investments are required to facilitate further growth. Having already outstripped Russia as the world's largest gas producer, by the end of the decade, the United States will become one of the world's largest gas exporters, fundamentally changing pricing and trade patterns in global energy markets. U.S. oil production, meanwhile, has grown by 60 percent since 2008, climbing by

three million barrels a day to more than eight million barrels a day. Within a couple of years, it will exceed its old record level of almost ten million barrels a day as the United States overtakes Russia and Saudi Arabia and becomes the world's largest oil producer. And U.S. production of natural gas liquids, such as propane and butane, has already grown by one million barrels per day and should grow by another million soon.

What is unfolding in reaction is nothing less than a paradigm shift in thinking about hydrocarbons. A decade ago, there was a near-global consensus that U.S. (and, for that matter, non-opec) production was in inexorable decline. Today, most serious analysts are confident that it will continue to grow. The growth is occurring, to boot, at a time when U.S. oil consumption is falling. (Forget peak oil production; given a combination of efficiency gains, environmental concerns, and substitution by natural gas, what is foreseeable is peak oil demand.) And to cap things off, the costs of finding and producing oil and gas in shale and tight rock formations are steadily going down and will drop even more in the years to come.

The evidence from what has been happening is now overwhelming. Efficiency gains in the shale sector have been large and accelerating and are now hovering at around 25 percent per year, meaning that increases in capital expenditures are triggering even more potential production growth. It is clear that vast amounts of hydrocarbons have migrated from their original source rock and become trapped in shale and tight rock, and the extent of these rock formations, like the extent of the original source rock, is enormous—containing resources far in excess of total global conventional proven oil reserves, which are 1.5 trillion barrels. And there are already signs that the technology involved in extracting these resources is transferable outside the United States, so that its international spread is inevitable.

In short, it now looks as though the first few decades of the twenty-first century will see an extension of the trend that has persisted for the past few millennia: the availability of plentiful energy at ever-lower cost and with ever-greater efficiency, enabling major advances in global economic growth.

WHY THE PAST IS PROLOGUE

The shale revolution has been very much a "made in America" phenomenon. In no other country can landowners also own mineral rights. In only a few other countries (such as Australia, Canada, and the United Kingdom) is there a tradition of an energy sector featuring many independent entrepreneurial companies, as opposed to a few major companies or national champions. And in still fewer countries are there capital markets able and willing to support financially risky exploration and production.

This powerful combination of indigenous factors will continue to drive U.S. efforts. A further 30 percent increase in U.S. natural gas production is plausible before 2020, and from then on, it should be possible to maintain a constant or even higher level of production for decades to come. As for oil, given the research and development now under way, it is likely that U.S. production could rise to 12 million barrels per day or more in a few years and be sustained there for a long time. (And that figure does not include additional potential output from deep-water drilling, which is also seeing a renaissance in investment.)

Two factors, meanwhile, should bring prices down for a long time to come. The first is declining production costs, a consequence of efficiency gains from the application of new and growing technologies. And the second is the spread of shale gas and tight oil production globally. Together, these suggest a sustainable price of around \$5.50 per thousand cubic feet for natural gas in the United States and a trading range of \$70-\$90 per barrel for oil globally by the end of this decade.

These trends will provide a significant boost to the U.S. economy. Households could save close to \$30 billion annually in electricity costs by 2020, compared to the U.S. Energy Information Administration's current forecast. Gasoline costs could fall from an average of five percent to three percent of real

disposable personal income. The price of gasoline could drop by 30 percent, increasing annual disposable income by \$750, on average, per driving household. The oil and gas boom could add about 2.8 percent in cumulative gdp growth by 2020 and bolster employment by some three million jobs.

Beyond the United States, the spread of shale gas and tight oil exploitation should have geopolitically profound implications. There is no longer any doubt about the sheer abundance of this new accessible resource base, and that recognition is leading many governments to accelerate the delineation and development of commercially available resources. Countries' motivations are diverse and clear. For Saudi Arabia, which is already developing its first power plant using indigenous shale gas, the exploitation of its shale resources can free up more oil for exports, increasing revenues for the country as a whole. For Russia, with an estimated 75 billion barrels of recoverable tight oil (50 percent more than the United States), production growth spells more government revenue. And for a host of other countries, the motivations range from reducing dependence on imports to increasing export earnings to enabling domestic economic development.

RISKY BUSINESS?

Skeptics point to three problems that could lead the fruits of the revolution to be left to wither on the vine: environmental regulation, declining rates of production, and drilling economics. But none is likely to be catastrophic.

Hydraulic fracturing, or "fracking"- the process of injecting sand, water, and chemicals into shale rocks to crack them open and release the hydrocarbons trapped inside-poses potential environmental risks, such as the draining or polluting of underground aquifers, the spurring of seismic activity, and the spilling of waste products during their aboveground transport. All these risks can be mitigated, and they are in fact being addressed in the industry's evolving set of best practices. But that message needs to be delivered more clearly, and best practices need to be implemented across the board, in order to head off local bans or restrictive regulation that would slow the revolution's spread or minimize its impact.

As for declining rates of production, fracking creates a surge in production at the beginning of a well's operation and a rapid drop later on, and critics argue that this means that the revolution's purported gains will be illusory. But there are two good reasons to think that high production will continue for decades rather than years. First, the accumulation of fracked wells with a long tail of production is building up a durable base of flows that will continue over time, and second, the economics of drilling work in favor of drilling at a high and sustained rate of production.

Finally, some criticize the economics of fracking, but these concerns have been exaggerated. It is true that through 2013, the upstream sector of the U.S. oil and gas industry has been massively cash-flow negative. In 2012, for example, the industry spent about \$60 billion more than it earned, and some analysts believe that such trends will continue. But the costs were driven by the need to acquire land for exploration and to pursue unproductive drilling in order to hold the acreage. Now that the land-grab days are almost over, the industry's cash flow should be increasingly positive.

It is also true that traditional finding and development costs indicate that natural gas prices need to be above \$4 per thousand cubic feet and oil prices above \$70 per barrel for the economics of drilling to work-which suggests that abundant production might drive prices down below what is profitable. But as demand grows for natural gas-for industry, residential and commercial space heating, the export market, power generation, and transportation-prices should rise to a level that can sustain increased drilling: the \$5-\$6 range, which is about where prices were this past winter. Efficiency gains stemming from new technology, meanwhile, are driving down break-even drilling costs. In the oil sector, most drilling now brings an

adequate return on investment at prices below \$50 per barrel, and within a few years, that level could be under \$40 per barrel.

THINK GLOBALLY

Since shale resources are found around the globe, many countries are trying to duplicate the United States' success in the sector, and it is likely that some, and perhaps many, will succeed. U.S. recoverable shale resources constitute only about 15 percent of the global total, and so if the true extent and duration of even the U.S. windfall are not yet measurable, the same applies even more so for the rest of the world. Many countries are already taking early steps to develop their shale resources, and in several, the results look promising. It is highly likely that Australia, China, Mexico, Russia, Saudi Arabia, and the United Kingdom will see meaningful production before the end of this decade. As a result, global trade in energy will be dramatically disrupted.

A few years ago, hydrocarbon exports from the United States were negligible. But by the start of 2013, oil, natural gas, and petrochemicals had become the single largest category of U.S. exports, surpassing agricultural products, transportation equipment, and capital goods. The shift in the U.S. trade balance for petroleum products has been stunning. In 2008, the United States was a net importer of petroleum products, taking in about two million barrels per day; by the end of 2013, it was a net exporter, with an outflow of more than two million barrels per day. By the end of 2014, the United States should overtake Russia as the largest exporter of diesel, jet fuel, and other energy products, and by 2015, it should overtake Saudi Arabia as the largest exporter of petrochemical feedstocks. The U.S. trade balance for oil, which in 2011 was -\$354 billion, should flip to +\$5 billion by 2020.

By then, the United States will be a net exporter of natural gas, on a scale potentially rivaling both Qatar and Russia, and the consequences will be enormous. The U.S. gas trade balance should shift from -\$8 billion in 2013 to +\$14 billion by 2020. U.S. pipeline exports to Mexico and eastern Canada are likely to grow by 400 percent, to eight billion cubic feet per day, by 2018, and perhaps to ten billion by 2020. U.S. exports of liquefied natural gas (LNG) look likely to reach nine billion cubic feet per day by 2020.

Sheer volume is important, but not as much as two other factors: the pricing basis and the amount of natural gas that can be sold in a spot market. Most LNG trade links the price of natural gas to the price of oil. But the shale gas revolution has delinked these two prices in the United States, where the traditional 7:1 ratio between oil and gas prices has exploded to more than 20:1. That makes LNG exports from the United States competitive with LNG exports from Qatar or Russia, eroding the oil link in LNG pricing. What's more, traditional LNG contracts are tied to specific destinations and prohibit trading. U.S. LNG (and likely also new LNG from Australia and Canada) will not come with anti-competitive trade restrictions, and so a spot market should emerge quickly. And U.S. LNG exports to Europe should erode the Russian state oil company Gazprom's pricing hold on the continent, just as they should bring down prices of natural gas around the world.

In the geopolitics of energy, there are always winners and losers. Opec will be among the latter, as the United States moves from having had a net hydrocarbon trade deficit of some nine million barrels per day in 2007, to having one of under six million barrels today, to enjoying a net positive position by 2020. Lost market share and lower prices could pose a devastating challenge to oil producers dependent on exports for government revenue. Growing populations and declining per capita incomes are already playing a central role in triggering domestic upheaval in Iraq, Libya, Nigeria, and Venezuela, and in that regard, the years ahead do not look promising for those countries.

At the same time, the U.S. economy might actually start approaching energy independence. And the shale revolution should also lead to the prevalence of market forces in international energy pricing, putting an

end to opec's 40-year dominance, during which producers were able to band together to raise prices well above production costs, with negative consequences for the world economy. When it comes to oil and natural gas, we now know that though much is taken, much abides- and the shale revolution is only just getting started.ð

AuthorAffiliation

EDWARD L. MORSE is Global Head of Commodities Research at Citi.

Copyright Council on Foreign Relations NY May/Jun 2014

Indexing (details)

Subject	Petroleum production; Economic trends; Environmental regulations; Energy policy; Business forecasts; Oil shale
Location	United States--US
Classification	9190: United States 8510: Petroleum industry 1110: Economic conditions & forecasts 4310: Regulation 1520: Energy policy
Title	Welcome to the Revolution: Why Shale Is the Next Shale
Author	Morse, Edward L
Publication title	Foreign Affairs
Volume	93
Issue	3
Pages	3-7
Number of pages	5
Publication year	2014
Publication date	May/Jun 2014
Publisher	Council on Foreign Relations NY
Place of publication	New York
Country of publication	United States
Publication subject	Political Science--International Relations
ISSN	00157120
CODEN	FRNAA3
Source type	Scholarly Journals
Language of publication	English
Document type	Cover Story
Document feature	Photographs;Illustrations

ProQuest document ID 1520424185
Document URL <http://libproxy.nps.edu/login?url=http://search.proquest.com/docview/1520424185?accountid=12702>
Copyright Copyright Council on Foreign Relations NY May/June 2014
Last updated 2014-05-06
Database 4 databases [View list](#)

Copyright © 2014 ProQuest LLC. All rights reserved. Terms and Conditions