

February 2016

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REPORT



Theo T oil tanker. ©MarineTraffic.com

EXPANDING AMERICA'S PETROLEUM POWER

GEOPOLITICS IN THE THIRD OIL ERA

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About the Author

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Earlier, Mills was a technology advisor for Bank of America Securities and coauthor of the *Huber-Mills Digital Power Report*, an energy-tech investment newsletter. He has testified before Congress and has briefed many state public-service commissions and legislators. Mills served in the White House Science Office under President Reagan and subsequently provided science and technology policy counsel to numerous private-sector firms, the Department of Energy, and U.S. research laboratories.

Early in his career, Mills was an experimental physicist and development engineer at Bell Northern Research (Canada's Bell Labs) and at the RCA David Sarnoff Research Center on microprocessors, fiber optics, missile guidance, nuclear energy, and nonproliferation, earning several patents for his work. He holds a degree in physics from Queen's University in Ontario, Canada.

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Executive Summary

As the year 2016 began, the first unrestricted exports of domestic crude oil left American ports for the first time in 40 years. The year also began with near-record low prices for crude, triggering financial stress for thousands of American shale businesses, most small and midsize. Oil prices have collapsed from a combination of factors: market manipulations from OPEC; slower worldwide growth; and the success of America's shale technology, which created a global oil glut.

These same shale businesses played a major role in keeping America from sliding back into a recession after the 2008 collapse, generating millions of jobs and cumulatively adding a trillion dollars to the economy. At risk now are not just the future economic benefits from the new American shale industry but the substantial geopolitical benefits that would accrue should the U.S. become a major player in world oil markets, a possibility heretofore inconceivable.

To assert—as many do—that oil's importance is waning, or should wane, is misguided. Oil enables global commerce at unprecedented levels as well as the personal mobility that propels social and economic freedoms. Compared with four decades ago, the number of cars in use worldwide has risen threefold, aviation miles sevenfold, and maritime shipments threefold; oil fuels 95 percent of all that transportation. The digital economy, a new force accelerating information exchange and commerce, will only enhance the role of oil in the exchange of goods and people in coming decades.

But the majority of world petroleum trade remains dominated by nation-state companies, often directed by authoritarian regimes that wield energy riches as weapons of influence or intimidation. There has never been a more opportune time for America to capture the geopolitical “soft power” benefits from greater oil production *and* exports.

Oil markets are cyclical: today's low prices will inevitably rebound, just as prices always fall when peaks occur. And when oil prices rise, Saudi Arabia, Russia, and Iran will still be major market players. Yet this time, there is a wild card: a cumulative \$1 trillion invested by American firms and financiers in shale technology, infrastructure, and assets. In the near term, we will continue to see “creative destruction” as many assets consolidate under stronger players, but a shale 2.0 resurgence will then follow. We've seen this kind of cycle before: in the late 1990s, the tech investment bubble ended in a bust; it was followed by a second Internet boom, which is still under way.

This paper argues that if, in the next decade, the U.S. were to replicate the shale production growth of this past decade, the nation would reap not only a second shale boom but also a tectonic shift in the geopolitical status quo. How can America expand its petroleum power in a new Third Oil Era, especially in the face of fierce global price manipulation and competition? The paper concludes by urging Congress to pursue four steps to help American oil firms compete in a low-cost environment that would also benefit consumers with sustained low prices and, not least, also expand U.S. geopolitical petroleum power.

1. **Cut red tape.** Reverse existing overregulation, freeze—and review—new intrusive regulation, and facilitate expansion of oil-related infrastructure.
2. **Cut corporate taxes.** Lower U.S. corporate tax rates to (at least) the OECD average and reform America's anti-competitive “repatriation” tax, which leaves hundreds of billions of dollars stranded offshore—money that could be invested in America.
3. **Drill more on federal lands.** Expand private-sector access to federal lands, instead of further restricting it. Increasing access to “sweet spots” would benefit the economy and add royalties to the Treasury.
4. **Repurpose the Strategic Petroleum Reserve.** Sell a share of the excess oil in the SPR—a surplus created by new shale production—to fund basic research in shale science and to fund new public-private partnerships that can test next-generation shale technologies.

EXPANDING AMERICA'S PETROLEUM POWER

GEOPOLITICS IN THE THIRD OIL ERA

I. Introduction

On December 31, 2015, the tanker *Theo T* left the Port of Corpus Christi carrying Eagle Ford shale oil bound for Europe (**Figure 1**). A few days later, another Europe-bound tanker left the Port of Houston with more shale oil. These shipments represented the first unrestricted sale of crude from America in 40 years.¹ They also signaled the opening of global markets to America's productive shale fields,

where entrepreneurs have played a key role in driving oil prices to a decade low.²

Thus begins the third geopolitical era for oil. It will be an era in which the importance of petroleum remains undiminished but the power of potentate states is increasingly diminished by an American transformation that has only just begun.

Those first exports epitomized the reversal of America's posture in the Second Oil Era—one marked by declining oil production and rising imports. Today, the U.S. is beginning to recapture the position that it held in the First Oil Era, when America was the world's fastest-growing and biggest producer of hydrocarbons. This turnabout is occurring at a unique time of tension, when political forces,

domestic and foreign, seek to damage America's oil industry, even as economic forces ensure that oil's commercial and geopolitical value is increasing.

The anti-oil movement is epitomized by the fossil-fuel divestment campaign, which pressures university and public pension funds to sell holdings in hydrocarbon companies and embrace "clean tech" firms instead.³ At the same time,

FIGURE 1.

Theo T Departs for Europe, December 31, 2015



Source: Port of Corpus Christi

huge public subsidies for petroleum alternatives continue to be dispensed while costly regulatory constraints on the oil industry escalate.

Yet the fact remains that the global economy requires more petroleum now than 40 years ago, for transportation and trade—making oil more critical than ever. Hundreds of billions of dollars in subsidies have yielded no significant alternatives to petroleum; except for North America, every major economic region—from China and India to Japan and Europe—is a net oil importer with rising oil dependence. Today, moreover, the majority of oil exports are supplied by monopolistic or nation-state companies that frequently use oil, or oil profits, in ways antithetical to U.S. interests.

But now, America has the ability to effect its long-sought transition from a position of geopolitical dependence to one of influence—and even, perhaps, eventual dominance—in vital world oil markets. America has the technology, resources, capital, and infrastructure capabilities to significantly expand its already prodigious hydrocarbon production—and thus become a major player in global oil trade. To date, however, U.S. policies have been passive, at best, affecting oil geopolitics chiefly because of reduced imports. While U.S. policymakers had little, if anything, to do with the rise of America's shale industry, sensible policies going forward could help sustain and expand private-sector investment in shale, especially now that global prices have collapsed.

What should Congress do? Ending America's crude export ban was necessary but insufficient. The next step should be to remove other barriers, including costly regulations that needlessly impede American oil entrepreneurs from operating—and, in some cases, surviving—at the lower prices that are the new normal for oil. Congress should also radically increase federal funding for long-term R&D in hydrocarbons, especially shale. Priorities should echo the reality that hydrocarbons supply 80 percent of America's energy and will do so for the foreseeable future.

Substantially increasing U.S. oil production would free up more crude for exports and affect geopolitics in ways favorable to U.S. national security and global stability. It would also yield substantial domestic economic benefits, replicating the hundreds of billions of dollars and millions of jobs that were added to the U.S. economy during the first shale revolution.

Until now, energy forecasts have projected that most of the marginal supply of oil in world trade would come from OPEC or Russia. If the U.S. merely signaled an intention to become a significant new swing producer and oil exporter, the geopo-

litical status quo would be transformed. Indeed, the potential impact of such an announcement would be amplified by two radical features of the U.S. shale industry that are new to global oil markets.

First, it has long been a truism of oil markets that demand can change far more rapidly than supply. Economic downturns or upswings can affect oil demand almost overnight; but major changes in oil supply take years to effect (with the exception of Saudi Arabia's legendary spare capacity). America's shale industry has changed the game: unlike conventional oil, new shale production can come online and ramp up in months, at volumes that rival OPEC's capability.

Second, until now, predicting how much new production capacity could emerge was relatively straightforward because most of the world's swing capacity was controlled by a small group of mega-companies—mostly nation-state enterprises and a handful of private super-majors (e.g., ExxonMobil, BP, Shell)—and from megaprojects. But now, the nation-state level of output from America's shale fields is profoundly different: it comes from the aggregate impact of thousands of small and midsize firms led by private entrepreneurs and investors, each making rapid, independent financial decisions. The world's new swing production is arising from market forces, not state-backed monopolies. The oil world is entering uncharted territory.

II. The Third Oil Era

Oil has been central to economic growth as well as to geopolitical turmoil for 120 years. However, the architecture of world oil markets today is as different from 1975 as 1975 was from 1935 (**Figure 2**).

The defining characteristic of the First Oil Era was the dominance of the U.S. as both a global oil producer and a net exporter. In 1935, the Middle East accounted for only 6 percent of world crude output while America accounted for 60 percent,⁴ even supplying Japan with 90 percent of its imports.⁵

A Second Oil Era emerged with the 1973–74 Arab oil embargo, the dramatic signal that the U.S. had shifted from oil dominance to dependence. Saudi Arabia cut off oil shipments to America in retaliation for the U.S. resupplying Israel's military (while the Soviets supplied the Arab armies) during the 1973 Arab–Israeli War. According to the Office of the Historian of the U.S. State Department, that conflict “brought the United States closer to a nuclear confrontation

with the Soviet Union than at any point since the Cuban missile crisis.”⁶

The embargo caused oil prices to triple overnight, wreaking economic havoc. It served as a geopolitical awakening,

spawning a new framework for U.S. oil policy, solidified in the 1975 Energy Policy and Conservation Act (EPAC). In his January 1976 State of the Union address, President Gerald Ford declared: “[EPAC is] not the complete answer to energy independence, but still a start in the right direction ... to

FIGURE 2.

First Oil Era, c. 1935

- ◆ **U.S. oil production is 20 times higher than 40 years earlier.**
- ◆ **The U.S. accounts for 60 percent of world oil supply, the Middle East 6 percent.**
- ◆ **Seven private companies dominate world oil production.**
- ◆ **Japan depends on the U.S. for 90 percent of its oil.**
- ◆ **President Franklin Roosevelt signs the Neutrality Act to stop weapons exports to nations at war. Persia is renamed Iran. Italy invades Ethiopia.**
- ◆ **DuPont invents nylon, the first synthetic fiber.**
- ◆ **General Motors is the most valuable company in America.**

Second Oil Era, c. 1975

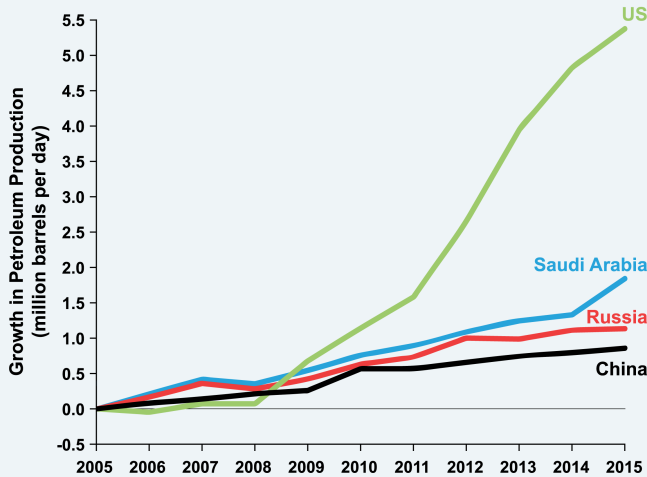
- ◆ **U.S. oil production is three times higher than 40 years earlier, but U.S. imports are up tenfold.**
- ◆ **The U.S. accounts for 25 percent of world oil supply, the Middle East 50 percent.**
- ◆ **The 1973–74 Arab oil embargo drives oil prices up by 300 percent.**
- ◆ **President Gerald Ford signs the Energy Policy and Conservation Act, banning U.S. crude exports.**
- ◆ **The Vietnam War ends. The Soviet Union signs the Helsinki Final Act, pledging “respect for sovereignty, independence and territorial integrity” of European states.**
- ◆ **Sony introduces the Betamax video recorder.**
- ◆ **Exxon is the most valuable company in America.**

Third Oil Era, c. 2015

- ◆ **After reaching a one-century low in 2008, U.S. oil production nearly doubles, thanks to shale technology. America accounts for the majority of the world’s *new* petroleum supply.**
- ◆ **Thousands of small firms produce 75 percent of American oil, with 25 percent produced by super-majors.**
- ◆ **Oil prices collapse from Saudi Arabia flooding an already glutted market.**
- ◆ **President Barack Obama signs the Bipartisan Budget Act, lifting the ban on U.S. crude exports.**
- ◆ **Syria’s civil war leads to the rise of Islamic State and to Europe’s refugee crisis.**
- ◆ **Personal drones proliferate.**
- ◆ **Apple is the most valuable company in America.**

FIGURE 3.

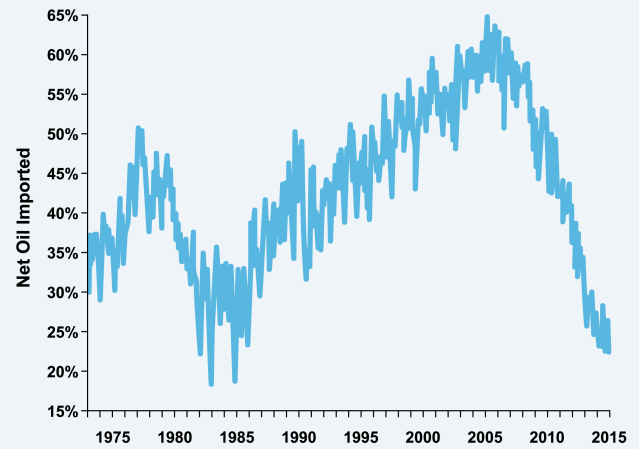
Growth in Output of Major Oil Producers



Data Source: U.S. Energy Information Administration

FIGURE 4.

Imports as a Share of U.S. Petroleum Use



Data Source: U.S. Energy Information Administration

make America invulnerable to the foreign oil cartel.⁷⁷ In the decades that followed, though, America's oil dependence and geopolitical vulnerability increased.

The Third Oil Era, anchored in the technology-centric shale boom, began almost a decade ago but has been obvious for only a few years. Consequently, policymaking and geopolitical analyses have yet to incorporate its implications or opportunities. The signature feature of America's subservience in the oil trade—import dependence—has dropped precipitously over the past decade and is now at a three-decade low. The U.S. is half as dependent on foreign oil as when President Ford signed EPAC. If imports from Canada are excluded from the calculus of dependency, America's reliance on overseas oil sources is lower still (**Figure 3** and **Figure 4**).⁸

One cannot credit EPAC or any of the subsequent (and similar) legislative initiatives during the Second Oil Era with the emergence of the Third Oil Era. EPAC, driven by a paradigm of petroleum shortages, had three core goals that were the essential features of American energy policy for decades: reduce oil use by promoting or subsidizing conservation and efficiency, such as by mandating auto fuel-efficiency standards; expand research and subsidies to replace oil with anything from biofuels to batteries; and protect domestic markets by banning oil exports and creating a Strategic Petroleum Reserve (SPR) as insurance against supply interruptions.

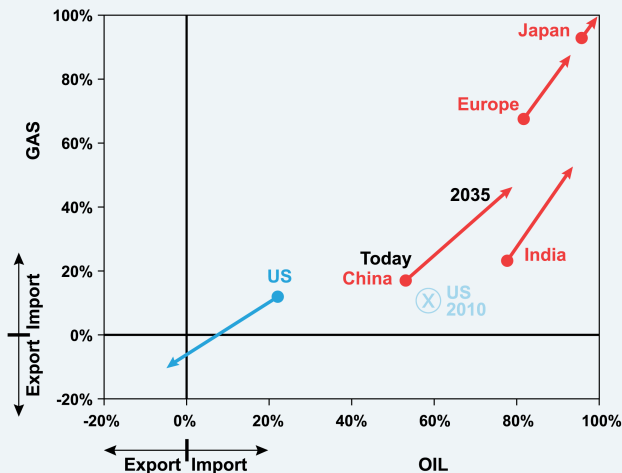
Did EPAC achieve these goals? The SPR was indeed built and holds a lot of oil. But despite conservation, efficiencies, and subsidies, U.S. oil use today is 15 percent *higher* than in 1975 (and still rising), and oil still fuels about 95 percent of transportation. Meanwhile, private-sector ingenuity and capital unleashed America's shale revolution.

As the Third Oil Era takes hold, some analysts argue that America's new oil bonanza will allow it to finally wind down its role in the Middle East and to worry less about policing sea-lanes and mediating regional resource conflicts.⁹ Some pundits also claim that the shale era signals the end of OPEC or Russian influence. Both formulations are wrong. What matters for world oil markets is that, for the first time in 40 years, there is a prospect for meaningful competition arising from an entirely new kind of oil production and entirely different types of businesses, all from the United States.

The Third Oil Era is unfolding at a critical time. While growth in oil use has slowed in America and Europe, largely spurred by demographic changes, demand elsewhere is on track to increase by an amount equal to adding another United States' worth of consumption over the coming decades.¹⁰ Moreover, dependence on oil imports is rising in every major economic region outside the U.S., from Asia to Europe (**Figure 5**).

FIGURE 5.

Projected Oil and Natural Gas Import Dependencies



Data Source: International Energy Agency

America is now uniquely positioned to play an important role in meeting rising global oil demand and to moderate geopolitical tensions that are inextricably tied to the trade and use of oil.

III. Oil and Geopolitical Tensions

Geopolitical history is rife with examples of nations using financial and physical resources, from food and fuel to minerals and manufactured goods in order to influence, intimidate, and engage in “gray zone” proxy wars. Such tactics, argues Michael Mazarr of the U.S. Army War College, are not new but have renewed relevance in today’s world, where “several major powers are making extensive use of gray zone campaigns,” including the use of “energy diplomacy.”¹¹

America’s nearly half-century absence from global oil exports created a vacuum that has been exploited frequently by other, often hostile, nations.¹² Many suppliers into world markets have used physical oil, as well as oil profits, as weapons, sparking tension and, occasionally, conflict.¹³ America has been involved, directly or indirectly, in each of the ten major wars that have been fought in the Middle East since the First Oil Era began.¹⁴

Issues in the Middle East, far more than any other region, pivot around money obtained from selling oil. The potential for restoring oil-export revenues motivated Iran to agree to a new nuclear deal in return for the lifting of international sanctions. India buys 69 percent of its oil from the Middle East; South Korea, 78 percent.¹⁵ Islamic State funds its military operations and terrorist activities with petroleum sold from captured oil fields in Syria.¹⁶

OPEC has made no secret about its goals: in public and (leaked) private comments, the oil cartel has made clear that it plans to retain, or recapture, market share—and damage U.S. oil firms—by openly colluding with other nation-state producers in ways that would not only be illegal in the U.S. but are antithetical to free trade.¹⁷

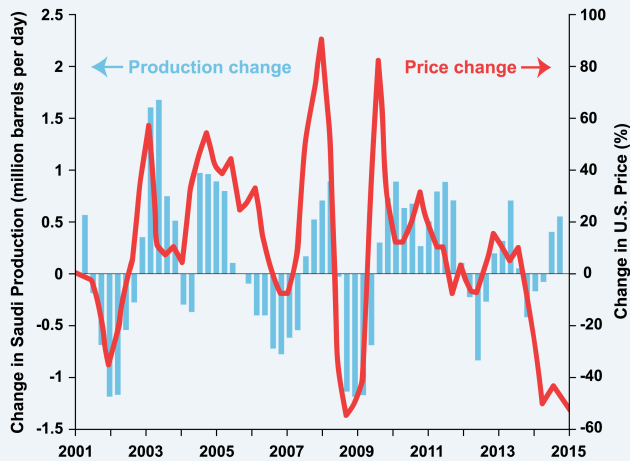
The implications that follow from America as an oil-exporting nation are only now beginning to appear in geopolitical analyses.¹⁸ Some have urged a “moral imperative” for America to displace oil sold by bad actors—a petroleum equivalent to addressing “blood diamonds.”¹⁹ U.S. Senator Lisa Murkowski, chairman of the Senate’s Energy and Natural Resources Committee, recently summarized the geopolitical opportunity: “Many U.S. allies and trading partners are interested in purchasing American oil to diversify away from Russia, Iran, and other problematic sources.... The mere option to purchase U.S. oil would enhance the energy security of countries such as Poland, Belgium, the Netherlands, India, Japan, and South Korea.”²⁰

To become a significant global player and shake up the petroleum status quo, America does not need to become a *net* exporter. Adding relatively small amounts of oil to world trade can be strategically and economically influential: it is the marginal supply of oil, added or withdrawn from markets, that is impactful. Even though the world consumes nearly 90 million barrels of oil per day, global markets and prices—and geopolitical tensions—are whipsawed by changes of 1 or 2 million barrels per day (Figure 6).²¹ Even without expanding its port infrastructure, the U.S. is capable of exporting nearly 2 million barrels per day.

What countries are most likely to buy American crude? While every importing nation is a potential customer, proximity—which affects shipping costs—suggests that South and Central America will be the immediate beneficiaries of U.S. oil exports.²² The scale of demand in these regions can be met with midsize tankers rather than the supertankers commonly used for long-distance trade; U.S. port facilities will need upgrading to accommodate the latter.

FIGURE 6.

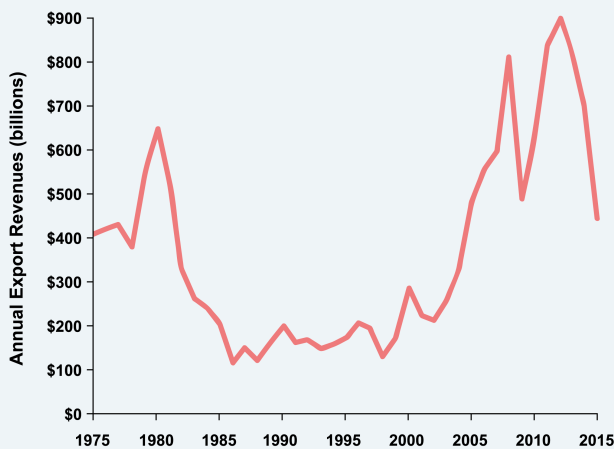
Changes in Saudi Arabia Production v. U.S. Oil Prices



Data Source: U.S. Energy Information Administration

FIGURE 7.

OPEC Revenues



Data Source: U.S. Energy Information Administration

Europe, which has long imported American gasoline and diesel fuel, can easily use established trade routes and infrastructure for new crude shipments. Access to Asian markets will improve when the Panama Canal's expansion is completed in several years, which will allow far larger ships to transit. In the longer term, even more Asia access would emerge if the China-funded plan for a larger Nicaraguan Grand Canal becomes reality.²³ To be competitive in Asian

markets, however, America's port infrastructure will require investment to accommodate ultra-large crude carriers.²⁴

Exporting oil—or indeed, any product—confers on America economic benefits and geopolitical leverage. While considerable attention has been afforded the former, there has been relatively little consideration for the latter in U.S. policy circles. That has certainly not been the case for other petroleum powerhouses.

“In the old days you built armies. Now you build a sovereign-wealth fund,” says Jayne Bok, a sovereign-wealth-fund guru.²⁵ Hydrocarbon profits account for 60 percent of the \$7 trillion in the world's sovereign-wealth funds.²⁶ But with today's low prices, such funds are being rapidly depleted to support exporting nations' domestic budgets that require an oil sale price of \$60–\$130 per barrel (Figure 7).²⁷ Competition that can help keep future oil prices low—and, with it, such governments' revenue—will force OPEC nations, as well as Russia, to prioritize domestic spending over foreign adventurism.²⁸ Lower oil prices may even cause some exporting nations to gradually move away from monopoly behavior, privatize some state assets, and cautiously embrace markets more generally.²⁹

How might boosting American oil exports affect geopolitical tensions associated with the world oil trade? Consider the following:

Diluting Iranian influence

With sanctions lifted, Iran hopes to attract more than \$100 billion in foreign investment to its oil fields to dramatically increase exports.³⁰ In reaction to low prices and to draw nations into dependency for Iranian oil, Iran is undertaking creative deals—including bartering oil for industrial equipment, investing in Airbus, and buying equity stakes in refineries in India and Spain—in exchange for long-term pledges to purchase Iranian oil.³¹ Boosting U.S. exports would offset the prospect of rising international dependency on Iran, while diluting the associated profits that Iran often used in the past to fund anti-American interests.

Unshackling Europe and Japan

Japan and Europe each depend on imports for 90 percent of their oil needs.³² During the 2014 E.U.–U.S. trade negotiations, a leaked memo revealed European eagerness for access to American oil.³³ Existing E.U.–U.S. infrastructure and trade relationships for refined petroleum products can be readily expanded.

FIGURE 8.

Global Oil Transport Choke Points*



* FIGURES IN MILLIONS OF BARRELS PER DAY

Source: U.S. Energy Information Administration

Hobbling Russia

Russia has a long history of using oil and natural gas exports as political weapons. More than 60 percent of Russian oil exports currently go to Europe:³⁴ Russia accounts for 96 percent of Poland's oil, for instance.³⁵ Adding American oil to global markets would increase competition and put downward pressure on oil prices, thereby reducing Russia's ability to subsidize America's enemies. Indeed, the current low-price environment has already forced Russia to drain \$35 billion from its two sovereign-wealth funds. If current low prices hold and Russia maintains current spending levels, its sovereign-wealth funds will be empty in less than two years.³⁶

Providing America a new bargaining chip with China

China is now the world's biggest oil importer. And though it is furiously expanding its strategic oil reserves, China's current storage volume would cover only 30 days' worth of imports.³⁷ China's increased oil dependence has also heightened tensions in the oil-rich South China Sea, while its state-owned oil companies have provoked conflict from Vietnam to Africa.³⁸ A goal to sell, say, several million barrels per day of oil "manufactured" in U.S. shale fields to China would net America over \$40 billion a year at today's prices, while collaterally creating a useful bargaining chip in political dealings with China.

Unshackling emerging economies

Many emerging markets, including India, Pakistan, and Vietnam, are net—and growing—oil importers, with the Middle East and Russia their main sources of new supply. India, for instance, gets almost 70 percent of its crude imports from the Middle East.

Diluting Venezuela's influence

For years, Venezuela has used its oil profits to export its brand of twenty-first-century socialism to its Latin American neighbors.³⁹ Nicaragua depends on Venezuela for 70 percent of its oil, Cuba for 60 percent, Jamaica for 32 percent, and the Dominican Republic for 23 percent. According to the IMF, Venezuela needs oil priced at more than \$150 per barrel to maintain Chavez-era spending levels. More foreign competition, in addition to encouraging domestic regime change, can limit Venezuela's capacity for anti-U.S. meddling abroad.

Taking pressure off sea-lane choke points

Two-thirds of all traded oil travels on the oceans. Of the seven shipping choke points, four are in, or near, the Middle East; another is in the South China Sea, where almost one-third of global seaborne oil transits (**Figure 8**).⁴⁰ Boosting U.S. oil exports can help reduce such congestion, thereby reducing supply disruption risks for importing nations, as well as taking pressure off the U.S. Navy in its efforts to ensure that global sea-lanes remain open and secure.⁴¹

Adding transparency and stability to global oil markets

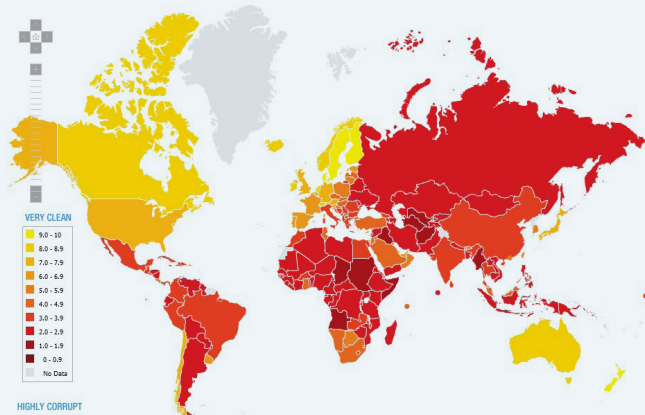
Today, every major oil exporter ranks poorly for national resource transparency and corruption (**Figure 9**).⁴² Because America scores well in these categories, as well as in rule-of-law metrics, an expanded role for the U.S. in oil trade would add confidence and stability to global commerce.

Moderating oil-price volatility

Global oil prices react, often dramatically, to conflicts that threaten to reduce petroleum availability. For decades, OPEC has had the largest single share (one-third) of all oil exported

FIGURE 9.

Public-Sector Corruption Index, 2014



Source: Transparency International

into global markets. Even though the market-pricing power of OPEC will not disappear, future price spikes can be substantially muted by the prospect of rapid supply growth from America.

IV. A Critical Geopolitical Commodity

Calls to end America’s “addiction” to oil are frequent and loud. Yet formulating energy policy based on this dangerous fiction—that the world is able to consume less oil in the near future—is foolhardy (Figure 10). Modern civilization is no more addicted to oil than life is addicted to oxygen: oil enables global commerce at unprecedented levels and makes possible the social and economic freedoms created by personal mobility. The digital economy, a new force acceler-

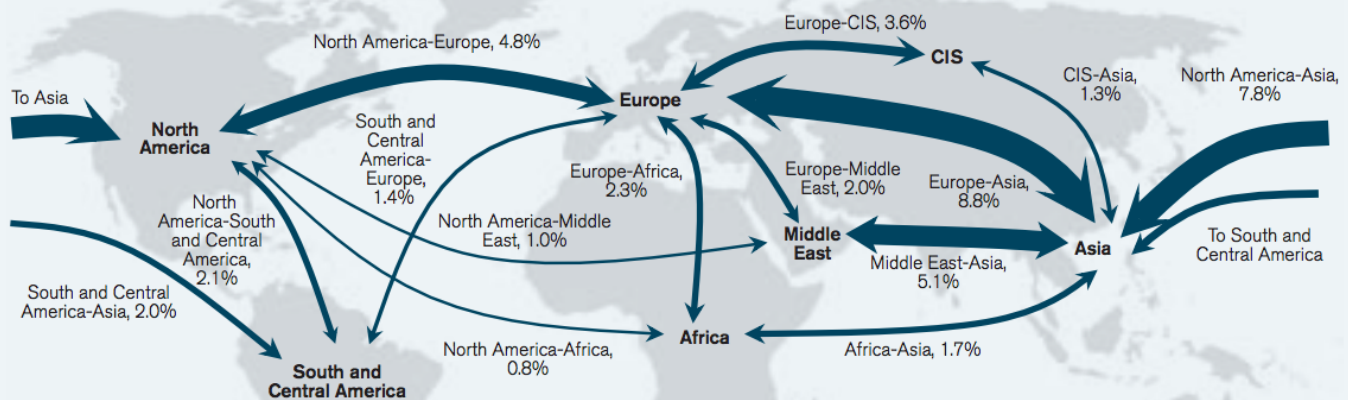
FIGURE 10.

Reality Check: Oil More Critical Now than in 1975

- ◆ Global petroleum consumption in 2015 was 150 percent of the 1975 level.
- ◆ Oil is the world’s largest single source of energy.⁴⁵ Civilization uses 1,000 barrels per second.
- ◆ Oil is the world’s largest traded commodity; all agricultural products combined are in second place.⁴⁶
- ◆ The share of oil used in the transportation sector has risen from one-third in 1975 to 60 percent today.⁴⁷
- ◆ Cargo ships, which move 90 percent of goods in global commerce, are powered by oil-fired engines. Maritime shipments have risen threefold since 1975.⁴⁸
- ◆ Air travel is completely dependent on petroleum: global air miles have risen sevenfold since 1975.⁴⁹
- ◆ More than 95 percent of all ground transportation is powered by oil-burning engines. Automobile ownership, averaging today fewer than 100 cars per 1,000 residents in emerging nations, is rising toward the Western average of 800 per 1,000.
- ◆ Even the mobile Internet, which is powered by coal, natural gas, and uranium in the West, is substantially oil-dependent in emerging economies.

FIGURE 11.

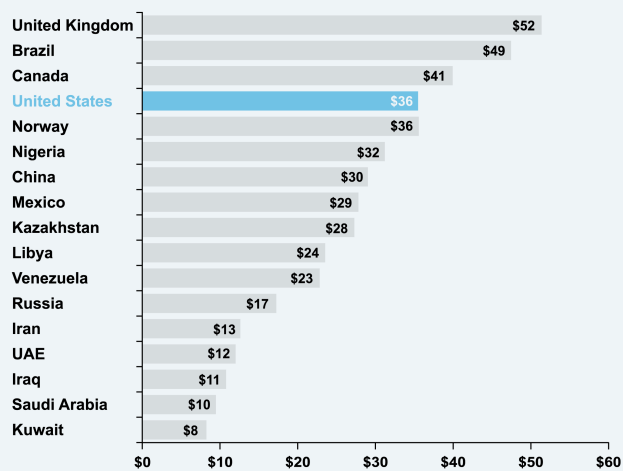
Interregional Trade, Share of Global GDP



Source: World Trade Organization

FIGURE 12.

Average Cost to Produce a Barrel of Oil



Data Source: Rystad Energy

V. Can Shale Compete at Low Prices?

By late 2014, the enormous growth in shale-oil output had displaced enough U.S. imports to create a global glut. America's oil imports from Saudi Arabia, for example, were down 30 percent.⁵² When OPEC met in November 2014, oil prices had already plunged by 35 percent since that past summer's peak. To maintain market share and push competitors out of business, Saudi Arabia responded by *increasing* output to further depress prices.⁵³ When OPEC met again in December 2015, the expanded glut and slower global growth had combined to drive prices down by another 35 percent—and Saudi Arabia maintained its record output.

To the surprise of many, numerous U.S. oil plays continue to be viable in the \$30–\$40 per barrel range (**Figure 12**):⁵⁴ technological progress⁵⁵ has continued to deliver surprising productivity gains sufficient to maintain output and even allow numerous companies to increase drilling during the price retreat.⁵⁶

Nevertheless, America's shale industry has been hit hard. The costs of loans, infrastructure, and transportation, in addition to the drilling costs, have put many shale players "underwater" at today's record low prices. In 2015, U.S. shale output shrank by 5 percent, year-over-year, after almost a decade of yearly increases. More than three dozen shale companies defaulted, with many more on that trajectory.⁵⁷ At least three-fourths of the oil- and gas-producing companies rated by Standard & Poor's now have junk credit status.⁵⁸ Layoffs across the shale ecosystem have exceeded 100,000 workers. Of the \$200 billion in oil and gas assets up for sale globally, many are in the United States.⁵⁹ As low prices ripple on, U.S. shale output will likely contract even more in 2016.

Saudi Arabia and all the other major oil-exporting nations, from Norway to Kazakhstan, are financing their losses by drawing down sovereign-wealth funds. The Saudi fund, the world's second-largest, is already down \$100 billion, from its 2014 peak of \$750 billion. In the U.S., private debt markets, not taxpayers, carry the risks of energy-sector losses, with 45 percent of oil loans held by American banks, 30 percent by foreign banks, and 25 percent by private nonbank entities.⁶⁰

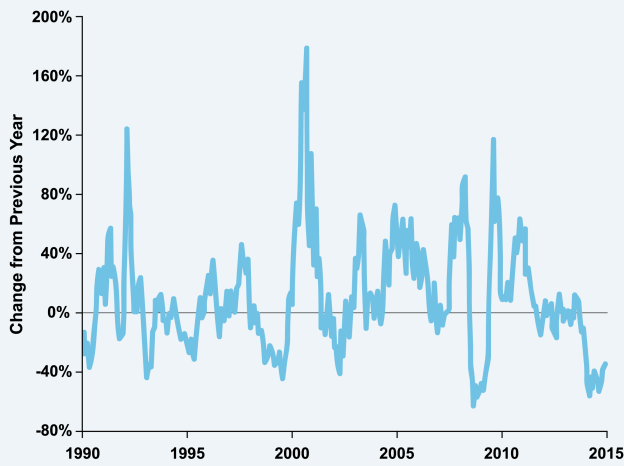
If global oil investment declines in 2016 as expected, this will mark the first time in 40 years that such investment has fallen in consecutive years.⁶¹ So far, global investment defer-

ating information exchange and commerce, will only enhance the role of oil in the exchange of goods and people in coming decades.⁴³ Today's world is far more interconnected, too: 60 percent of global GDP is linked to interregional trade, up from 30 percent four decades ago (**Figure 11**).⁴⁴

As for the purported "multitude" of alternatives to oil, the list turns out to be short and has not changed for decades: biofuels, batteries, and energy efficiency. Alas, none comes close to displacing petroleum at the scale and price that the world needs. Natural gas, oil's hydrocarbon cousin, offers the only significant alternative to oil. Hence Bill Gates's observation that finding options "cheaper than today's hydrocarbon energy ... [and] as reliable as today's overall energy system" would require a "miracle."⁵⁰ Google's engineers have reached a similar conclusion: "improvements to existing [renewable energy] technologies aren't enough; we need something truly disruptive.... Those technologies haven't been invented yet."⁵¹

A common response to such observations is to propose that governments launch alternative-energy programs modeled on the Manhattan Project or the Apollo Program. But fueling all of humanity is not like putting several people on the moon. It's like putting *everybody on earth* permanently on the moon. The former was a one-time engineering feat; the latter would take miraculous technology that today resides only in the minds of science-fiction writers.

FIGURE 13.

Crude-Oil Price Volatility, 1990–2015

Data Source: Federal Reserve Bank of St. Louis

als involve projects intended to tap nearly 30 billion barrels of reserves; many are deepwater projects that take a long time to spool back up.⁶² About 150 global oil projects have likely been deferred indefinitely, collectively representing more than 12 million barrels per day of future production—greater than America’s or Russia’s total output.⁶³

Though 2016 began with prices near record lows, history suggests that prices are due to rebound (**Figure 13**). Most petroleum lenders and investors—who collectively hold more than \$500 billion in capital ready to deploy—are banking on the fact that oil is a cyclical commodity and that prices will inevitably rise as production slows but demand keeps growing.⁶⁴ If history is any indicator, it will take less of a price rise than many might imagine to stimulate a return to drilling; the shale revolution began when oil prices were under \$45 per barrel, using technology that is far less productive than now available.

The core issue is not whether prices will rise again, but when and by how much. Russia’s finance minister, for instance, expects prices to remain low, perhaps below \$50, for at least a decade. OPEC is more bullish but does not see oil reaching \$70 per barrel until after 2020.⁶⁵ And now, a new wild card in world markets will put a lid on how high oil prices rise: How quickly will America’s enormous shale assets be reenergized with even a modest uptick in prices?

Energy economist Philip Verleger has persuasively argued that cheap money over the past eight years, supplied by the

Federal Reserve’s quantitative-easing program, accelerated investment in America’s shale ecosystem, leading to more drilling and infrastructure expansion than might otherwise have occurred.⁶⁶ But any “extra” assets created by cheap debt and high prices do not disappear in a downturn but instead end up with new owners. When creative destruction upends a cyclical market, firms consolidate as stronger players acquire valuable property, companies, and technologies at distressed prices. Massive quantities of shale assets are now in place.⁶⁷ This phenomenon is, as noted, analogous to the late 1990s tech investment boom and bust, which was followed by consolidation and the second Internet boom, which is still under way.

With both the Internet and shale, new technology is the key to making assets more valuable, especially in a low-price environment. Surveys of the state of shale technology make clear that many new tools and techniques—from sensors and robotics to analytics and automation—have yet to be deployed and can bring substantial, even radical, cost reductions.⁶⁸

VI. Conclusion

If the U.S. were to replicate in the next ten years the growth in shale production that has occurred over the past ten years, it would cause a tectonic shift in the geopolitical status quo. The congressional repeal, at the end of 2015, of the antiquated ban on exports was essential but only a first step toward realizing all the benefits that could arise from America becoming a petroleum powerhouse.⁶⁹ What can Congress do to encourage vigorous private-sector investment to replicate the radical expansion of U.S. oil output?

The underlying framework for U.S. energy policy needs to be realigned to reflect the realities of the Third Oil Era (**Figure 14**). That will be feasible only if policymakers shake off political reflexes conditioned by four decades of Second Oil Era thinking and reject the newly energized, but misguided, thesis that the world can and should abandon petroleum.

Given the reality that oil is economically vital and geopolitically potent and that low prices not only benefit consumers but also usefully constrain capital flowing to bad actors on the world stage, policy should focus on *costs*. There are two generic classes of action where Congress can make a difference: reduce costly burdens on the oil industry; and stimulate the emergence of new technologies that are key to reducing future costs for producing shale oil.

With regard to costly burdens, many of the actions important for stimulating investment in, and expansion of, the U.S. petroleum industry are similar to those sought across America's industrial landscape, specifically:

- ◆ **Reverse overregulation, freeze new regulations, and streamline permitting.**

The overly aggressive use—and even misuse—of regulations from those associated with, for instance, the Clean Air Act and Endangered Species Act can radically increase the cost and time required to expand oil-related infrastructure, from pipelines and refineries to ports. Rather than seek to hobble a vital U.S. industry, policymakers should find streamlined ways to meet environmental and safety goals to encourage private investment in infrastructure expansion. China, for example, has facilitated refinery expansion to take advantage of low-cost crude and is now exporting more refined product than it imports for the first time in a decade.⁷² America should follow suit.

Congress should direct the creation of an interagency review of the state of U.S. seaports and related infrastructure relevant for crude exports, specifically identifying impediments to, and opportunities for, expedited expansion. For example, the Louisiana Offshore Oil Port (LOOP) was built in 1982 for crude *imports* and is the only U.S. port capable of berthing the supercarriers.⁷³ LOOP is well positioned to be rapidly converted into a major export terminal.⁷⁴

A time-out is also needed on imposing yet more regulatory constraints, such as the senseless rules now being promulgated to force spending on equipment to eliminate flaring of excess natural gas at drill sites. (Natural gas is so abundant that it is often burned off, or “flared,” at the wellhead of oil rigs; all of America’s oil and gas wells constitute just 5 percent of global flaring.)⁷⁵

- ◆ **Reduce corporate tax burdens.**

The U.S. corporate tax rate is the highest in the industrial world.⁷⁶ It is a driving force behind the “tax inversion” trend wherein major American companies merge with foreign firms to relocate ownership to nations with lower taxes. Lowering the U.S. tax rate, at least to the OECD average, would not only help keep major corporations in America but would be particularly beneficial for the small businesses that dominate the U.S. oil industry.

Similarly, Congress should radically reduce, or eliminate, the “repatriation” tax penalty, a step that would encourage firms to bring home profits from foreign operations and invest more in America. Under the current anticompetitive system, U.S. energy and industrial firms have \$400

billion in profits left overseas (an amount that rivals the offshore profit holdings of the tech industry).⁷⁷ As Walter Wriston, former chairman and CEO of Citibank, observed: “Capital goes where it is welcome and stays where it is well treated.”⁷⁸

- ◆ **Expand private access to “sweet spots” on federal lands.**

The shale revolution occurred almost entirely on private and state land. Doubling the current federal lease allocations would open up access to high-quality resources for expanded production, greatly increasing federal royalties for the Treasury; doing so would still leave 90 percent of federal territory off limits to drilling.⁷⁹ Since it takes nearly ten times as long to obtain permits for federal, as opposed to state, lands, streamlining the federal permitting process will be critical, too.

FIGURE 14.

They Said It...

“The U.S. must decide for itself the role it will play in the 21st century; the Middle East will be our most immediate—and perhaps most severe—test. At question is not the strength of American arms but rather American resolve in understanding and mastering a new world.”⁷⁰

HENRY KISSINGER

former secretary of state,
October 2015

“Too often foreign-policy debates in America focus on issues such as how much military power should be deployed.... Ignored is a powerful, nonlethal tool: America’s abundance of oil and natural gas.”⁷¹

LEON PANETTA

former secretary of defense and
former CIA director, May 2015

With regard to the second category for constructive congressional action—helping stimulate new technologies that lower future costs—policymakers should:

♦ **Advance basic research in shale science.**

Congress should triple U.S. Department of Energy (DOE) spending in basic sciences associated with shale hydrocarbons, including geophysics, geology, chemistry, and related analytics. Additionally, foundational improvements are needed in the DOE's Energy Information Administration's (EIA) shale-data models and analytics. The EIA provides critical basic information for Congress and private markets alike but uses modeling, data, and analytic tools that are outmoded and inaccurate, particularly for shale hydrocarbons.⁸⁰

There is a long history of bipartisan support for federal funding of basic research that is directed largely at university scientists as well as those in federal and corporate laboratories. Yet less than 8 percent of the DOE's energy R&D budget is associated with hydrocarbons⁸¹—the fuel sources that supply over 80 percent of U.S. energy⁸² and will do so for decades yet, according to EIA forecasts.⁸³ The DOE takes credit for having played an early supporting role in the basic research that helped pave the way for America's shale revolution.⁸⁴ But many features in the underlying science remain poorly understood; better science can lead to better technologies. While the U.S. shale industry spends about \$3 billion annually to develop oil and gas drilling-related technologies,⁸⁵ very little of this is in basic science, and thousands of small companies rarely engage in R&D of any kind.

♦ **Accelerate emerging shale technologies with public-private partnerships.**

Congress should direct the DOE to form, say, a half-dozen "strategic petroleum research & technology" (SPR-Tech) centers, one in each of the major shale fields, with 50/50 cost-sharing with the private sector. There is a growing shale tech ecosystem—a virtual Silicon Valley for shale—that is pursuing new kinds of sensors, materials, analytics, advanced robotics, and control systems.⁸⁶ Most of this will mature and emerge naturally in private markets. But sometimes, end-users as well as innovators face considerable challenges in bridging the "valley of death" for early-stage technologies—getting from the laboratory into real-world demonstrations.

The DOE and other federal agencies—notably, the Department of Defense and, in particular, the highly regarded Defense Advanced Research Projects Agency (DARPA)—have long pursued various forms of technology-demonstration programs. However, energy-related federal support has too often been marked by failure, whether from cronyism, bureaucratic sclerosis, or politically driven mission creep into industrial-class projects best left to private investment. Iconic failures include the Carter-era Synfuels project and the Obama-era Solyndra fiasco.⁸⁷ But public-private partnerships can be effective when the private sector has skin in the game in the form of cost-sharing and when technology selection is driven by private-sector expertise, rather than bureaucratic calculation. Each SPR-Tech center would be an operating shale well (which would generate revenues to offset costs), managed by an experienced private firm with relevant expertise, with technology selection to be determined primarily by private-sector experts emulating the successful DARPA model.

These two proposals—advancing basic research in shale science and accelerating emerging shale technologies via public-private partnerships—would not necessitate reduced spending on existing DOE research programs, or the imposition of new taxes, if the associated costs were provided by tapping into funds that the shale industry itself has made available: specifically, the excess quantity of petroleum stored in America's SPR.

The SPR, established by EPAC to ensure that sufficient oil was on hand in the event of "significant disruptions," now holds nearly double the 90 days of imports considered necessary for disruption protection—thanks to the productivity of the shale industry (**Figure 15**).⁸⁸ Acknowledging this, the 2015 Bipartisan Budget Act directed the sale of 100 million barrels, about 12 percent of the SPR, to free up funds for deficit reduction and SPR maintenance.⁸⁹

Given the SPR's strategic purpose, it would make sense to sell off more of its excess and use those funds to strengthen America's strategic *technological* position with regard to oil. A sale could take effect in a measured way at a future date to minimize the impact on oil markets. (Perhaps construct a strategic deal with a long-term benefit to a U.S. ally, emulating the kind of strategy engaged in by Iran and Saudi Arabia.) Such a sale could raise more than \$4 billion at no cost to taxpayers and, when matched by the private sector, power at least twice that much spending on shale science and technology. (While some analysts have proposed eliminating the SPR entirely because of America's new production capacity

and falling oil imports,⁹⁰ that idea ignores the fact that the U.S. still imports significant amounts of oil and will continue to do so even as America expands its exports.)⁹¹

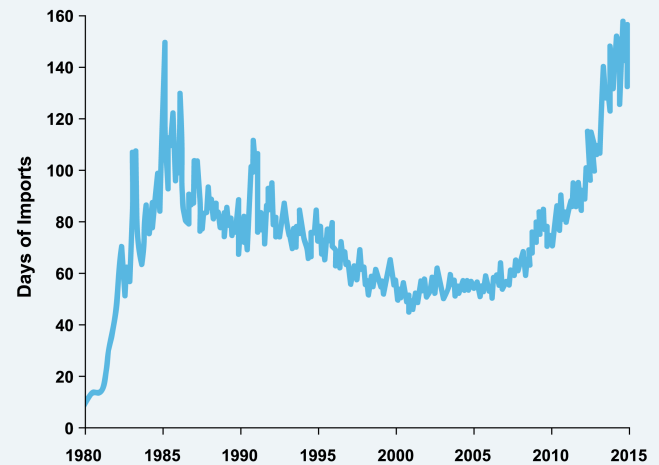
Proposals to foster more and better hydrocarbon technology inevitably encounter the claim by anti-oil activists that such actions constitute “favors” for “Big Oil.” That tired phrase traces its roots to the First Oil Era, when seven private companies accounted for 50 percent of global oil production.⁹² Those days are long gone. In America, thousands of small and midsize firms, often with only dozens of employees, produce 75 percent of U.S. oil and gas output.⁹³ Only eight privately held firms, of which just three are American, rank among the world’s 30 largest oil companies.

But Big Oil does exist in the form of roughly two dozen nation-state oil companies that control more than 70 percent of global oil reserves.⁹⁴ From Saudi Aramco (Saudi Arabia) and NIOC (Iran) to Gazprom (Russia) and PetroChina (China), such firms are overseen by authoritarian governments and control access to far more oil—ten to 100 times more—than even the largest private oil firms, American and non-American alike. America’s shale entrepreneurs and businesses are, in reality, competing against foreign Big Oil.

Global oil demand will inexorably grow. Oil prices will inevitably rise, too, as slowing investment limits new supply. Congress should help ensure that global oil monopolists do not have free rein to fill the supply gap.

FIGURE 15.

SPR Inventory Level*



*DAYS OF COVERAGE TO REPLACE ALL IMPORTS

Data Source: U.S. Energy Information Administration

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- ⁸² See <https://www.eia.gov/todayinenergy/detail.cfm?id=21912>.
- ⁸³ See http://www.eia.gov/forecasts/aeo/section_energyconsump.cfm.
- ⁸⁴ See <http://energy.gov/sites/prod/files/Sandalow%20innovation%20remarks%2010-21-11.pdf>.
- ⁸⁵ See <http://blog.ihs.com/ihs-ceraweek-2013-preview-new-sources-of-innovation-to-realize-the-energy-future>.
- ⁸⁶ See http://www.manhattan-institute.org/pdf/eper_16.pdf.
- ⁸⁷ See <http://www.gao.gov/assets/670/669847.pdf>.
- ⁸⁸ See <http://www.eia.gov/todayinenergy/detail.cfm?id=24072>.
- ⁸⁹ See <https://www.congress.gov/bill/114th-congress/house-bill/1314/text#toc-H2D8D609ED2A3417887CC3EAF49A81E15>.
- ⁹⁰ See <http://www.heritage.org/research/reports/2015/08/why-congress-should-pull-the-plug-on-the-strategic-petroleum-reserve>.
- ⁹¹ See <http://www.wsj.com/articles/does-the-u-s-need-a-large-strategic-petroleum-reserve-1447642801>.
- ⁹² See <https://www.mtholyoke.edu/acad/intrel/Petroleum/ftc3.htm>.
- ⁹³ See <http://www.census.gov/econ/subs/>; and <http://www.ipaa.org/wp-content/uploads/downloads/2011/12/2009ProfileOfIndependentProducers.pdf>.
- ⁹⁴ See <http://www.forbes.com/sites/christopherheman/2012/07/16/the-worlds-25-biggest-oil-companies/#452cd38459d3>.

Abstract

The majority of world petroleum trade remains dominated by nation-state companies, often directed by authoritarian regimes that wield energy riches as weapons of influence or intimidation. There has never been a more opportune time for America to capture the geopolitical “soft power” benefits from greater oil production *and* exports.

Key Findings

1. Oil markets are cyclical: today’s low prices will inevitably rebound, just as prices always fall when peaks occur.
2. The global economy requires more petroleum now than 40 years ago, for transportation and trade—making oil more critical than ever.
3. If, in the next decade, the U.S. were to replicate the shale production growth of this past decade, the nation would reap not only a second shale boom but also a tectonic shift in the geopolitical status quo.