

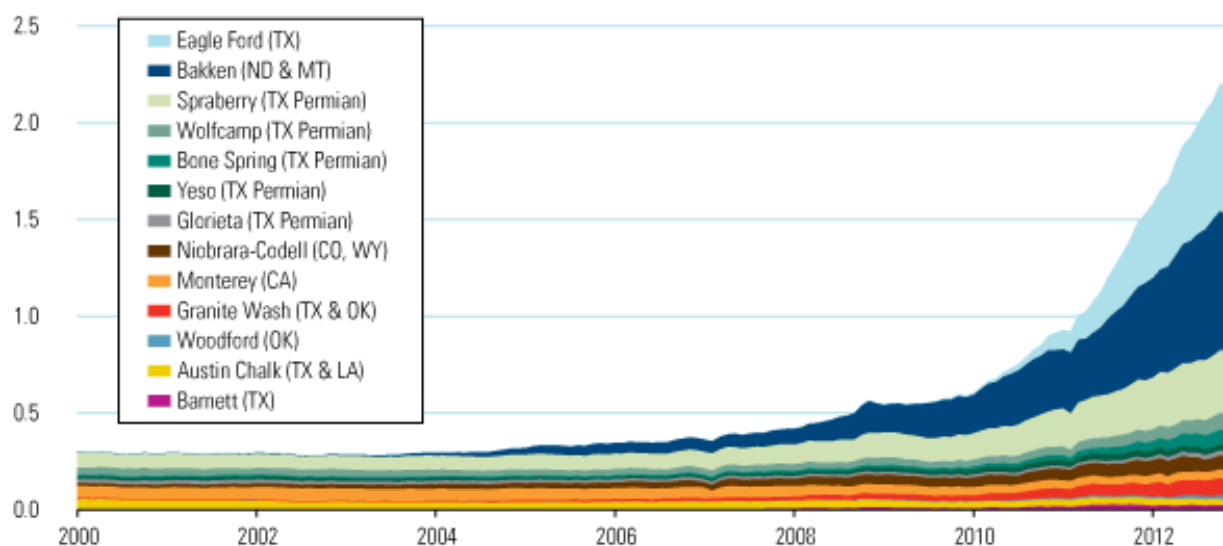
# STWA Market Watch

## America's Energy Boom Remaking Geopolitical Landscape

The global political and economic implications of the recent historic surge in U.S. oil and gas production have been well documented and widely publicized by research organizations such as the federal [Energy Information Agency](#) and Europe's [International Energy Agency](#), both of which forecast that domestic oil output will eclipse Saudi Arabia before the end of this decade<sup>1</sup>. Regaining top position as the world's largest oil producer, a distinction the United States has not held since the early 1970s, re-shuffles the geopolitical deck and places several potent and tantalizing new cards in the hands of America's political and business leadership.

With many decades worth of predictable, inexpensive and reasonably clean energy supply coming online, the U.S. oil and gas industry appears poised to almost singlehandedly deliver a number of clear-cut economic, national security and foreign policy advantages to the nation and its allies and much of the rest of the world. How well these cards are played or whether they're used wisely at all may shape the next several decades of American foreign policy and determine the global balance of power for generations.

### Climbing U.S. Production of Tight Oil Million Barrels Per Day



Source: Drilling Info, Texas RRC, North Dakota Department of Mineral Resources, EIA, U.S. Global Investors

Figure 1. Climbing U.S. Production of Tight Oil.

<sup>1</sup> International Energy Agency, 'World Energy Outlook 2012'; U.S. Energy Information Agency, 'Drilling Productivity Report' Nov. 12 2013.

## U.S. Energy Independence

The use of horizontal drilling and hydraulic fracturing techniques to unlock massive reserves deeply buried in shale formations such as North Dakota's Bakken, Texas' Eagle Ford and Permian Basin, Colorado's Green River and Utah's Uintah Basin has fundamentally reinvigorated the exploration and production sector, rocketing unconventional production to [over 7 million barrels a day](#). According to the International Energy Agency, production from U.S. tight oil reserves will reach around [14 million barrels as early as 2016](#), surpassing the output of Saudi Arabia. Present U.S. daily oil consumption hovers in the [18 million barrels per day](#) range.

Among the opportunities now within Washington's grasp is the enticing prospect of near total energy independence, an elusive goal that policymakers and the energy industry itself had until recently thought unlikely. Proven reserves stretching from the largely untapped Monterey-Santos and Green River formations in the West to the enormous Marcellus formation in the East now position America as having [more oil beneath our feet than all of the OPEC nations combined](#). Thanks to surging production in shale hotspots already online, in 2011 the U.S. became a net exporter of petroleum products for the first time in 60 years, shipping a record [3.37 million barrels a day for three weeks](#) during the month of October.

By reducing oil imports (the U.S. currently imports roughly [40 percent of the petroleum it uses](#)), researchers such as the International Energy Agency say the nation could come [close to energy self-sufficiency as soon as 2030](#). While curtailing oil imports is only one element among many responsible for America's massive trade imbalance, burgeoning domestic production could provide a useful tool in combating the worrisome trade deficit should federal restrictions on crude oil exports be reassessed or lifted altogether. Currently, oil imports make up approximately [40 percent of the nation's \\$750 billion annual trade deficit](#).

Annual U.S. net exports of total petroleum products, 1949-2011  
million barrels per day

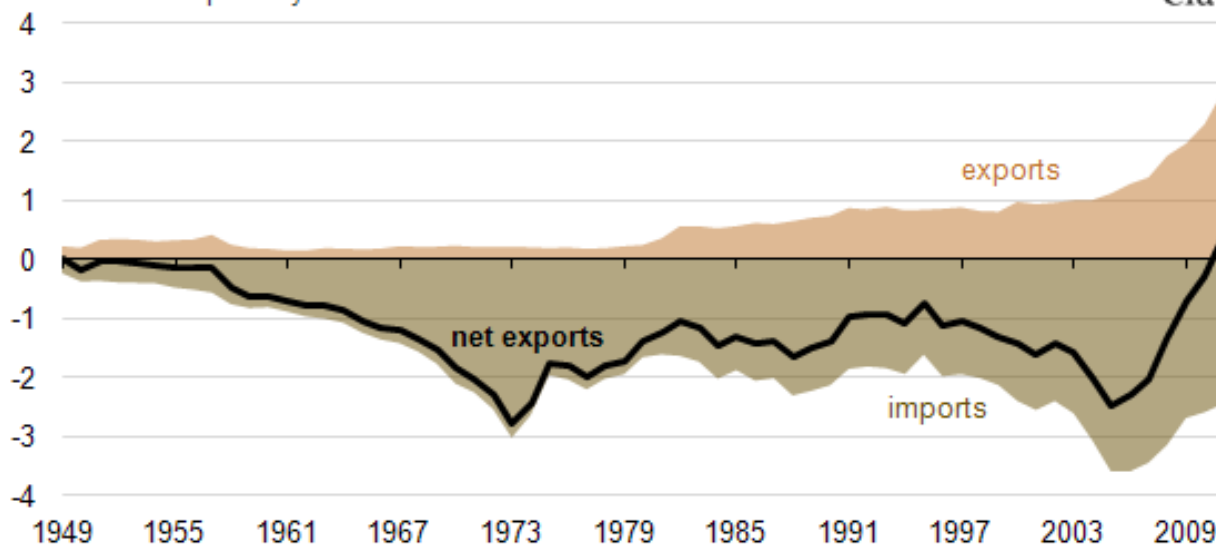


Figure 2. Annual U.S. net exports of total petroleum products, 1949-2011.

## Trade and Foreign Policy

Although existing U.S. crude export restrictions are not absolute (refined oil can be exported as fuel and the Commerce Department makes other exceptions in the form of export licenses), opponents contend that removing the ban would create an enormous stimulus to the U.S. economy and create hundreds of thousands of direct and indirect jobs, all while shrinking the deficit. Industry organizations such as the [American Petroleum Institute](#) (API) contend that the trade restrictions instituted in 1975 in retaliation for OPEC's (Organization of Petroleum Exporting Countries) embargo of the sale of oil to the U.S. are today woefully out-of-date and unnecessary.

The API notes that supply and demand factors may force the issue soon anyway. Without significant new construction, Gulf Coast and Canadian refineries will likely be overwhelmed by upstream supply, necessitating a production slowdown if exporting isn't an option. All told, [U.S. refineries have a maximum capacity of about 18 million barrels a day](#), a ceiling that shale production could outstrip within just a few years according to industry estimates.

Many foreign policy experts maintain that the upside of America's resurgence as a global energy producer goes far beyond the obvious benefits of reducing the influence of petrostates hostile to Western interests. A paper published by the [Center for Strategic and International Studies](#) suggests that unconventional oil output from the U.S. and Canada may blunt the ability of Middle East producers to influence the daily basket price of oil as they have done in the past, shifting the center of the global energy markets from OPEC's headquarters in Vienna, Austria to Washington, DC. In addition to providing greater self-sufficiency for the entire Western Hemisphere and energy independence for North America, U.S. energy exports may also free a number of European nations from their long-standing and uneasy dependence on Russia for oil and gas.

Used astutely as a cornerstone of foreign policy, America's resurgent fortunes in energy resources can be leveraged to serve a variety of purposes, says Carlos Pascual of Columbia University's Center on Global Energy Policy. In a recent [speech](#) he proposed that the nation has the unique opportunity to facilitate greater competition in global markets and a higher degree of transparency in geopolitical relations.

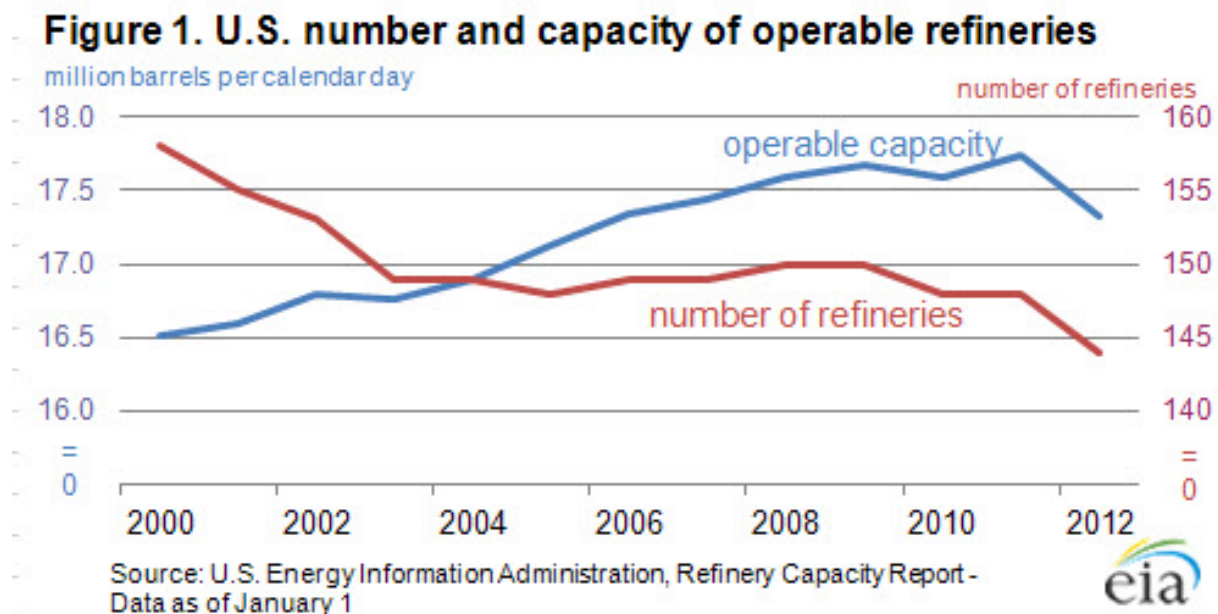


Figure 3. U.S. number and capacity of operable refineries.

## Global Economic Stimulus, Stability and Growth

On a purely economic basis, the domestic crude oil and natural gas industry contributes more than \$1 trillion annually to the U.S. economy and makes up 7 percent of the U.S. gross domestic product, according to a study by PricewaterhouseCoopers LLP, [‘The Economic Impacts of the Oil and Natural Gas Industry on the U.S. Economy in 2011’](#).

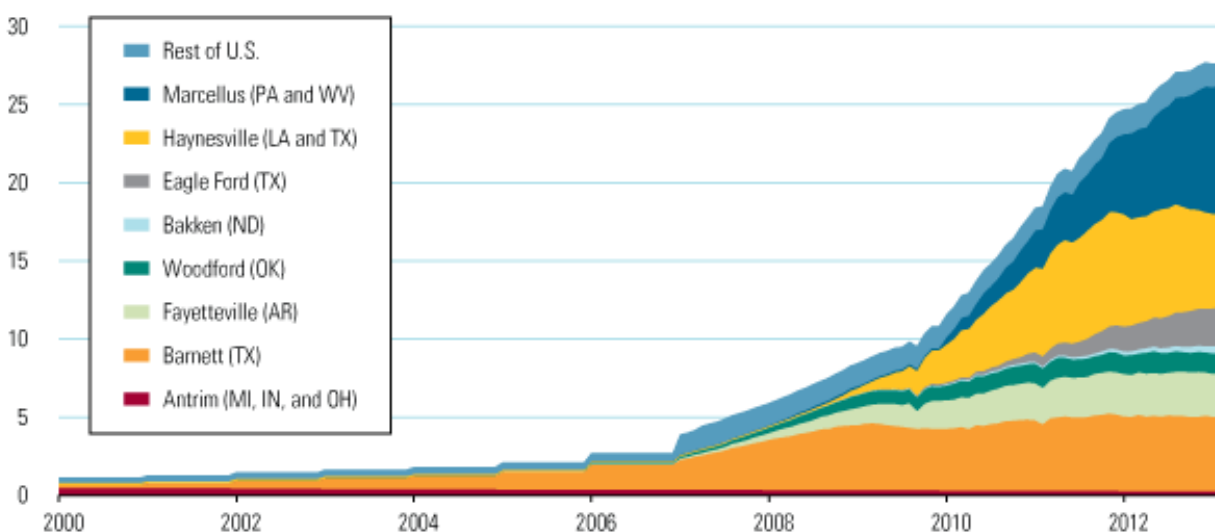
Other studies show that much of the measurable benefit to the U.S. economy is best seen through the prism of lower utility costs due to cheap natural gas prices and jobs created directly and indirectly by the oil and gas industry. In a report by Bank of America/Merrill Lynch, low cost natural gas (roughly a third what Europeans pay and a fifth of what Japanese are used to) was credited with saving U.S. companies and consumers an average of [\\$566 million per day during 2013](#). In addition to leveling the playing field for America’s rebounding manufacturing sector, this has already had a beneficial impact on disposable U.S. household income the report states, increasing it by an average of \$1,200 through reduced energy bills and overall lower living expenses. By 2015 this number may top \$2,000 in 2015 and eclipse \$3,500 by 2025.

Beyond America’s shores, the global energy industry is an “engine of global economic growth” according to the World Economic Forum. In [‘Energy for Economic Growth’](#), a report issued in March 2012, the independent public policy organization stated that due to a highly skilled workforce with higher than average wages, “energy industry employees contribute more absolute spending per capita to the economy than the average worker and contribute a larger share of GDP per worker than most”.

As a driver of economic expansion, research has repeatedly shown the energy sector is without equal. Due to the “employment multiplier effect” of providing three indirect jobs for each direct hire, “the energy industry is unique in its economic importance and has the potential to be a tremendous catalyst for job creation and sustainable growth without harming the sector’s overall performance,” according to [Daniel Yergin](#), chairman of IHS CERA, the research firm that compiled the study.

### Dramatic Increase of U.S. Shale Gas Production

Billion Cubic Feet Per Day



Source: EIA, U.S. Global Investors

Note: LCI Energy Insight gross withdrawal estimates as of March 2013 and converted to dry production estimates with EIA-calculated average gross-to-dry shrinkage factors by state and/or shale play.

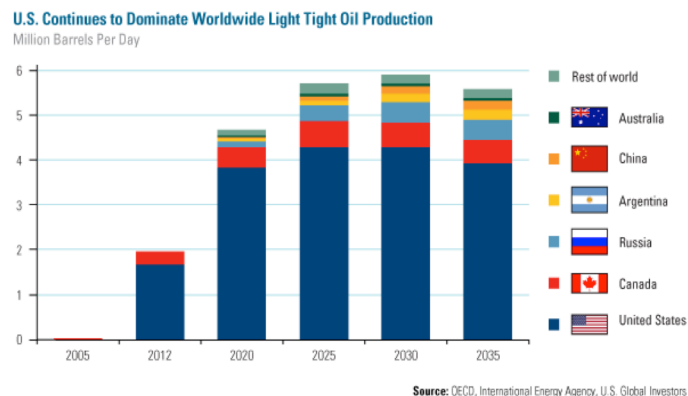
Figure 4. Dramatic Increase of U.S. Shale Gas Production.

## Launchpad for Exporting American Innovation and Technology

Although shale formations every bit as enticing as those being exploited domestically exist throughout the world, the U.S. is virtually alone in coaxing an unprecedented oil boom from their depths. In fact, even though over [40 nations have significant proven oil and gas shale reserves](#), the U.S. is expected to remain as the [primary supplier of light tight oil to the world until at least 2035](#),

The difference appears to be the magical formula of American ingenuity, readily available risk capital and an entrepreneurial spirit willing to roll the dice.

More than any single factor, the U.S. oil boom has depended on home-grown technologies to identify and exploit the oil and gas recoverable in the earth's shale formations. Horizontal drilling (also called 'directional drilling') was pioneered as far back as the 1930s but did not become practical or widely adopted until the 1970s when downhole motors (mud motors) spread in popularity. (An EIA paper ['Drilling Sideways: A Review of Horizontal Well Technology and Its Domestic Application'](#) chronicles the history and development of this upstream technology).



**Figure 5. U.S. Continues to Dominate Worldwide Light Tight Oil Production.**

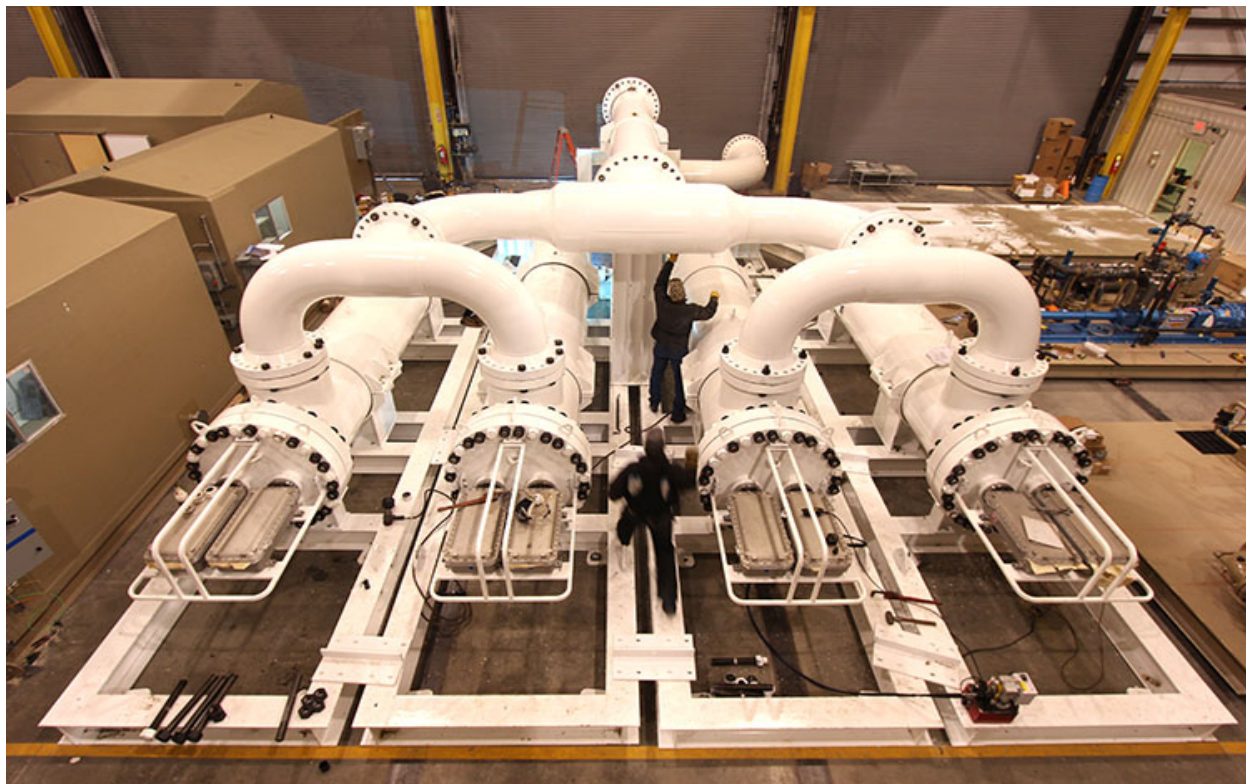
[Hydraulic fracturing](#) also has a storied history, dating from experimental wells drilled in 1947 and the first successful commercial application by Halliburton Oil Well Cementing Company two years later. However, it wasn't until 1973 that massive hydraulic fracturing was put to use in gas plays in the Denver Basin, Green River Basin and other tight sandstone formations in the western U.S., resulting in thousands of productive wells.

Despite the ebb and flow of the fortunes of the U.S. energy sector, it remains unchallenged as the oldest, most experienced and most innovative workforce and industrial supply chain in the [world's \\$6 trillion energy marketplace](#). When it comes to supporting the infrastructure necessary to locate, reach and extract tight oil and gas from several thousand feet to a mile or two below the surface of the earth, it would be difficult to imagine a more compelling hothouse environment than America's rough and tumble, winner-take-all oil and gas industry.

As other nations replete with shale formations such as Russia, China, Argentina, Libya, Australia, Venezuela, Mexico and dozens of others begin sizing up the task of recovering these buried assets, U.S. industry stands to gain billions in delivering and servicing the tight oil recovery technologies they've invented, perfected and proven domestically. The global demand for these offerings promises to be enormous; a [report](#) documenting the shale oil and gas resources found in 41 nations around the world published by the EIA on June 10, 2013 shows an estimated 345 billion barrels of world shale oil resources and 7,299 trillion cubic feet of world shale gas resources that are technically recoverable. In contrast, within the U.S. there are an estimated 48 billion barrels of shale oil and 1,161 trillion feet of shale gas.

Perhaps the greatest lesson to be gained thus far from the 21st century's oil and gas renaissance is that the energy industry still requires copious amounts of capital, intensive research and development, and public policies favorable to encouraging private enterprise, academia and government to cooperatively harness the resources waiting to be located and recovered beneath our soil and waters. Fortunately, the U.S. provides a model example for other nations to consider.





**Figure 6. STWA's AOT Midstream Installation during final test fit prior to delivery to client, Feb 2014. Photo courtesy of Power Service, Inc.**

#### **ABOUT STWA, INC.**

STWA, Inc. is a Nevada Corporation that works with commercial entities, educational institutions and industry manufacturers to deliver innovative solutions and licensable technologies to the conventional energy production and transportation industry.

Stock and Financial information can be found at:

<http://ir.stockpr.com/stwa/overview>

SEC filings can be found at:

<http://ir.stockpr.com/stwa/all-sec-filings>

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