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The Reindustrialization of America Has Begun - (Part 1)

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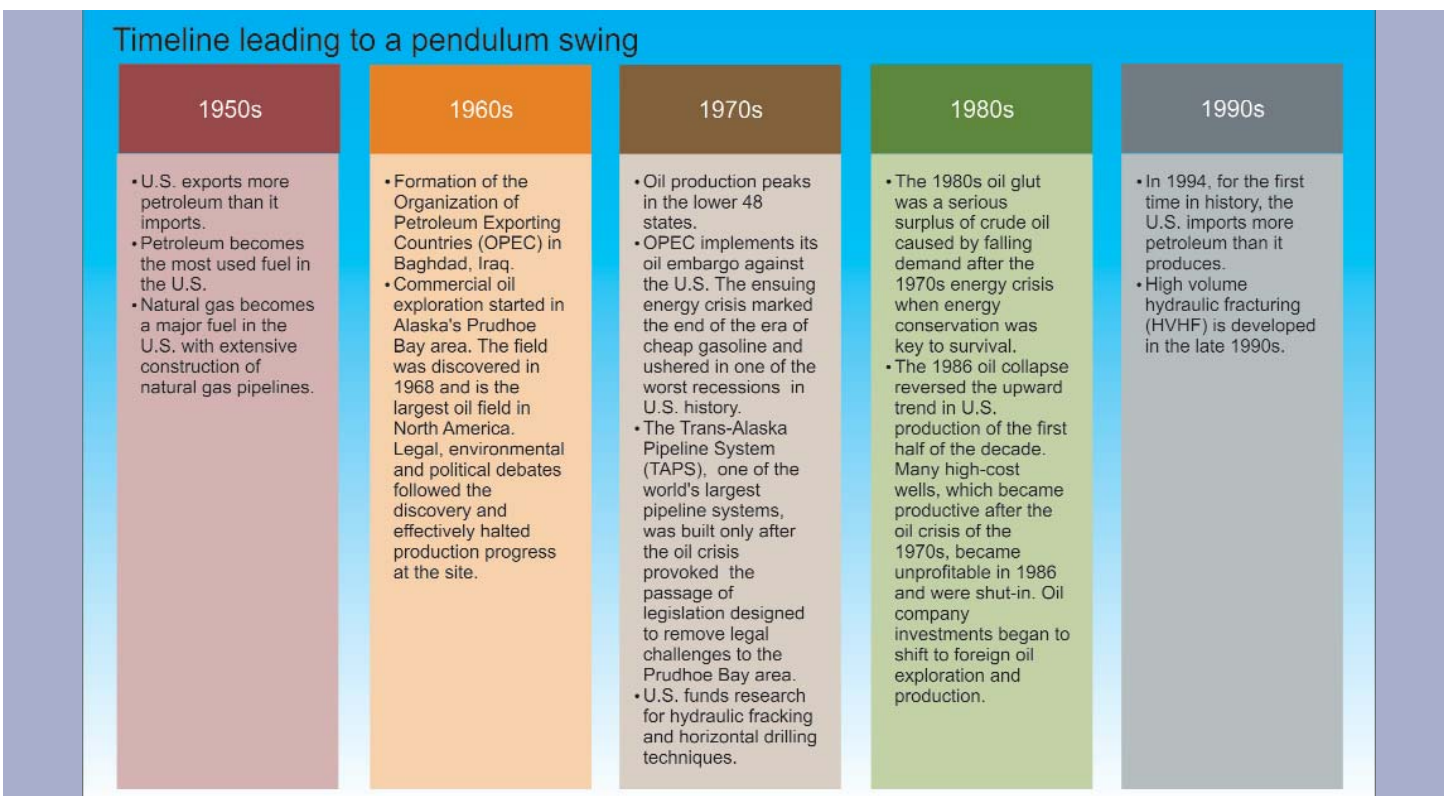
High volume hydraulic fracturing technology and horizontal drilling of shale rock formation are creating the path to U.S. energy self-sufficiency

The Original Industrialization of America

Each day brings a new view and challenge to the ever-changing energy market. In America's Industrial Revolution, it is hard to overestimate the importance of the first commercial oil well drilled in 1859 by Edwin Drake in Pennsylvania, which began America's and the world's first petroleum rush. Then, it was full steam ahead with new and faster modes of transportation and production. Tight integration of the energy and industrial production markets created materials for the iron and steel industries; railroads connected the country; and the birth of the modern oil industry was marked with the discovery of the Spindletop geyser near Beaumont, Texas, at the turn of the century. Given the huge amount of oil that glutted the market after this discovery, the price of oil dropped from $2.00 to $0.03 per barrel, and oil began its role as the most extensively used fuel source in the U.S.[1] hence the name, Black Gold…Texas Tea.

The rapid rise of oil use from 1900 to 1950 fueled the growth of modern transportation and dramatic gains in domestic and international trade. Since that time, several key factors contributed to a major pendulum swing. In 1994 for the first time in history; the U.S. imported more petroleum



[1] Paleontological Research Institution, "Spindletop Texas," www.priweb.org (accessed February 1, 2013)

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than it produced.

Fast forward to today's ever-changing energy market. Few times in recent American history has the change in fossil fuel prices shifted the energy market in such a rapid fashion. This shift was fueled by the technological advances in hydraulic fracturing and sophisticated horizontal drilling techniques utilized today. These dynamic changes have caused a paradigm shift in the future of energy in the U.S. and the world. Liquid fuels imports have had a consistent rise for the time period of 1950 to 1977 reaching its peak of 47 percent. United States' energy dependence declined to 27 percent by 1985 during the oil crisis. After this period the trend increased to 60 percent by the year 2005. Net imports by 2012 are estimated at 41 percent with further declines projected by EIA through 2014. In one case study the United States will cease to be an importer by the mid-2030s, and by 2040 exports become 8 percent of U.S. production.

NELSON has designed and engineered both onshore and offshore production platforms since the 1950s.This article provides insight to the dramatic changes for the reindustrialization of America and the events leading to the next major pendulum swing…to a time when the U.S will regain its energy independence.

Fracking leads the way to the next pendulum swing to a time when the U.S. will regain its energy independence

Thanks to the applications of hydraulic fracturing technology and horizontal drilling of shale rock formations, North America is now on a path toward energy self-sufficiency and independence. The implication of the world's largest energy consumer becoming self-reliant in gas is possibly the biggest event in the global energy market since the oil crisis of the 1970s, which forever changed the country's view on its dependence on imported oil and, in particular, oil imported from OPEC.

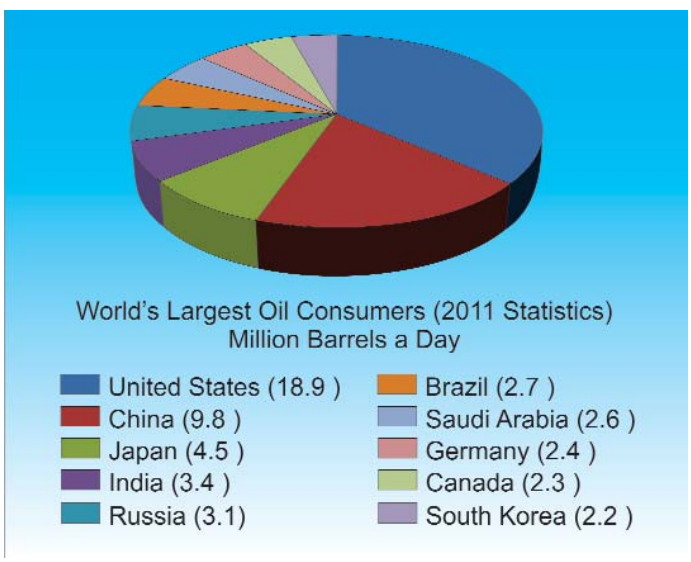
> The energy crisis has not yet overwhelmed us, but it will if we do not act quickly...Our decision about energy will test the character of the American people and the ability of the President and the Congress to govern this nation. This difficult effort will be the 'moral equivalent of war,' except that we will be uniting our efforts to build and not to destroy.
>
> - President Jimmy Carter
> Address to the Nation, April 18, 1977 [2]

The oil crisis of the 1970s sparked two key factors that played vital roles in the energy market.

- First, it promoted the passage of legislation to remove legal challenges to the Alaska Prudhoe Bay area that had been stalled with legal, environmental and political debates since the field's discovery in 1968. It is the largest oil field in both the United States and in North America, covering 213,543 acres and originally containing approximately 25 billion barrels of oil.
- Hydraulic fracturing, in existence since 1947, was a cost-prohibitive process. Driven by the oil crisis and sponsored by U.S. funding, horizontal slickwater fracturing, the modern fracturing technique, made the extraction of shale gas economical with its first documented use in 1998 at the Barnett Shale site in Texas.

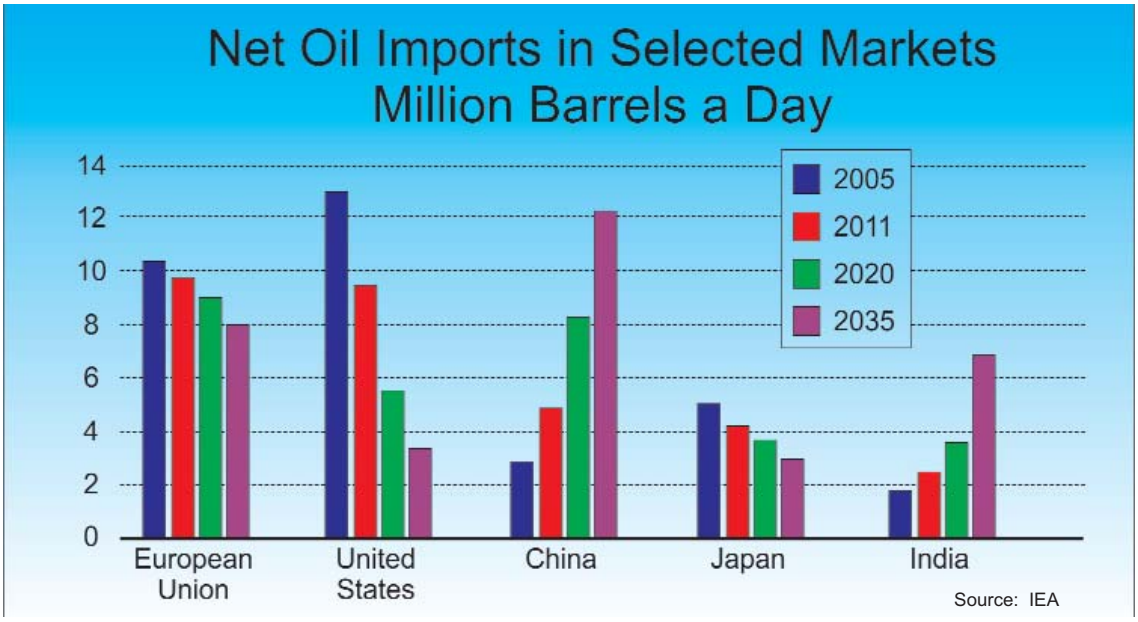
These two factors are of paramount importance in understanding and interpreting what will take place with this new technology. When the U.S. perceives a threat to its independence, the populace of the U.S. will rise to the occasion and allow industry to advance its technology to maintain its independent lifestyle. That strong independence will help advance the shale plays that may be the saving grace in restoring the country's energy independence.

Lately, shale plays have received a great deal of attention as more and more developments focus on the importance of U.S. shale harvested by fracking, which has helped reverse the 40-year decline of U.S. domestic oil production. "Hubbert's Peak" has ruled as production fell to under 5 mmboe/d from a peak double of that in 1970. Outside of a rise in the late 1970s/early



Source: EIA

[2] Jimmy Carter, "The Moral Equivalent of War," Time Magazine, October 18, 1982



1980s brought on by a 12-fold increase in the price of oil in seven years, production was in a multi-decade steep decline—until the U.S. shale revolution.[3]

What is fracking?

Experts have known for years that natural gas and oil deposits existed in deep shale formations, but until recently, the vast quantities of these hydrocarbons in these formations were not thought to be recoverable. Today, extraordinary amounts of natural gas and oil are being safely produced from deep shale formations across the country through the use of hydraulic fracturing and sophisticated horizontal drilling techniques.

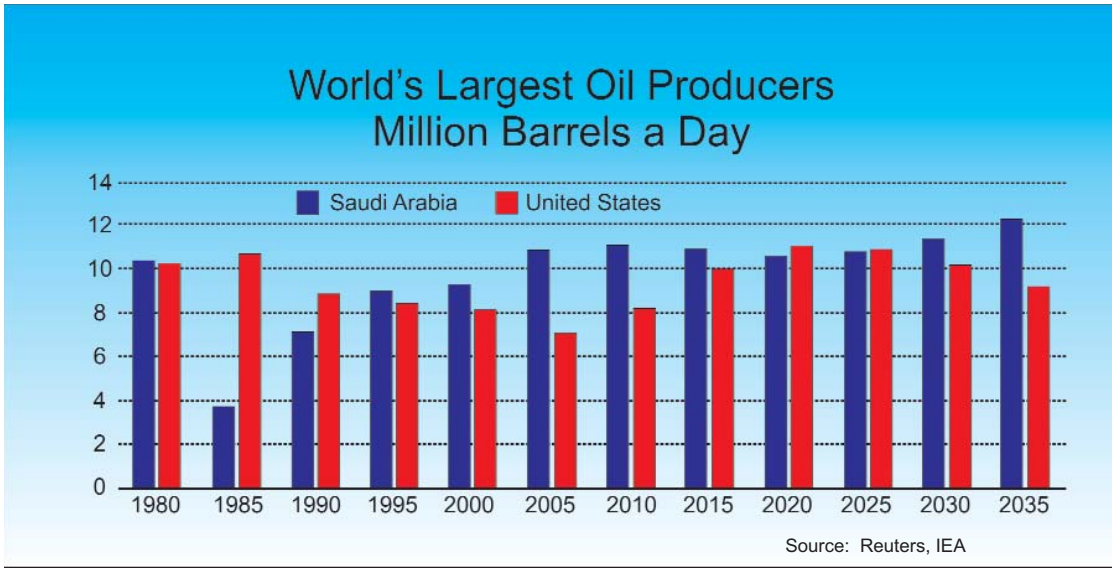
Induced hydraulic fracturing or hydrofracturing, commonly known as fracking, is a technique used to release petroleum, natural gas (including shale gas, tight gas, and coal seam gas), or other substances for extraction. This type of fracturing creates fissures from a wellbore drilled into reservoir rock formations. Although the technology has actually been around since the 1940s, it was not until after OPEC's oil embargo in 1973 and the ensuing energy crisis that the U.S. Department of Energy began funding research into fracking and horizontal drilling into deep shale natural gas and oil, where wells go down and then sideways (instead of the traditional vertical wells) for thousands and thousands of feet. The financial thinking behind developing this technology was that deep shale natural gas and oil development were critical to America's energy needs and its economic renewal. The modern fracking process has evolved into "high volume" hydraulic fracturing (HVHF) and was developed in the late 1990s and really began to be used more extensively after 2005.

Where is it happening?

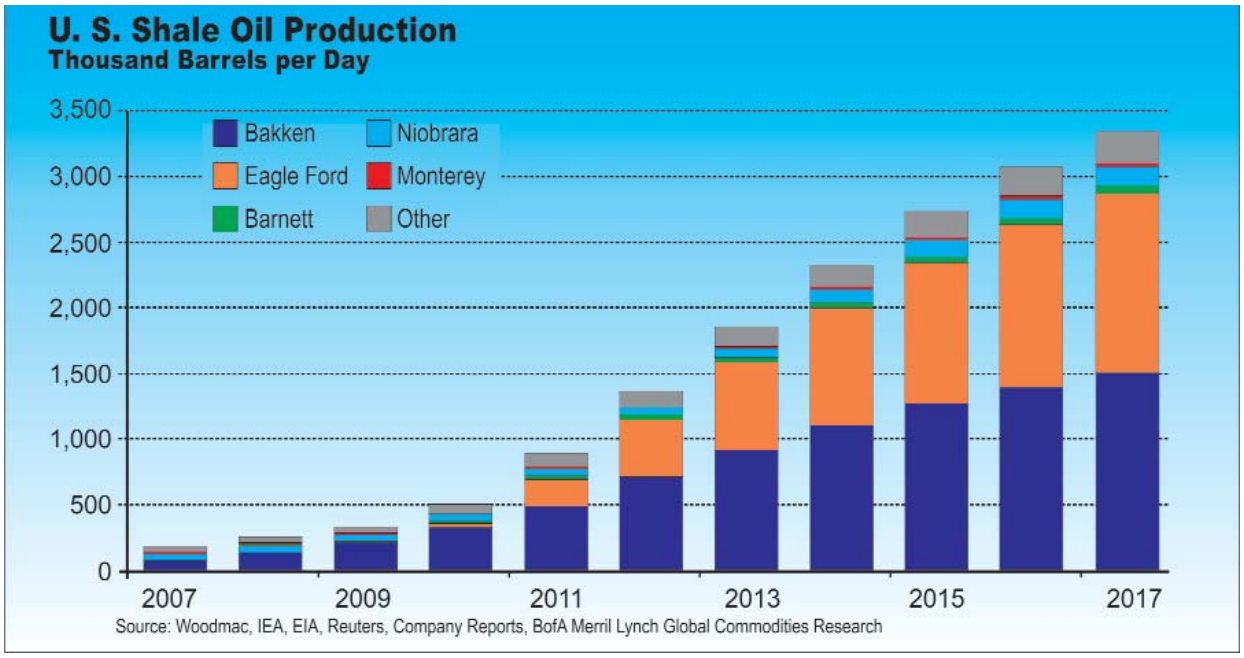
It's happening everywhere! The UK recently joined the mix and allowed fracking technology, but France and Bulgaria have outlawed it; China is going full-steam ahead; Germany is now debating fracking as its energy costs rise; and the list goes on and on. However, what is important is that the U.S. has the natural resources available and that the U.S. has the sophisticated technology required to harvest those resources. Not every country has that technology available to them, and since the U.S. has the longest history with hydraulic fracturing, its approaches to these technologies will likely be modeled by other countries.

What is the immediate effect for the U.S.?

The immediate effect of HVHF fracking technology is a reduction in U.S. crude imports. The U.S. Department of Energy states that in October 2012 U.S. crude imports dropped 9.2 percent from a year earlier to over 8 million barrels a day. This is the lowest import of crude since January 2000. Five years ago, Bakken production was 125,000 barrels per day; today the barrels pumped per day has increased exponentially. The U.S. Energy Information Administration (EIA) states that the U.S. will pump an



[3] 5 Hidden Oil Shale Plays for 2013," www.seekingalpha.com (accessed January 2, 2013)



average of 7.32 million barrels a day in 2013 and 7.92 million barrels in 2014.[6] North Dakota's Bakken crude overtook the smallest OPEC producer, Ecuador, and is closing in on the second smallest, Qatar, which produced 750,000 barrels in December.[7]

Our slow economy and recovery from the 2008 financial meltdown and the improving fuel-economy standards required by the U.S. has led to a 16-year low in oil demand in 2012. American Petroleum Institute (API) reports oil imports for the same year have fallen 6.9 percent, a new 15-year low. [8]

In the next issue of the Consultant, we will explore the impact of Liquid Natural Gas (LNG) as a major export of the United States and the strategic importance it is projected to play in the political and economic aspects of North America, as well as the major impact it has on the Gulf Coast Region for the chemical, energy and related markets. Specifics will be provided for projects in Louisiana which exceed $62 billion dollars in direct expenditures.

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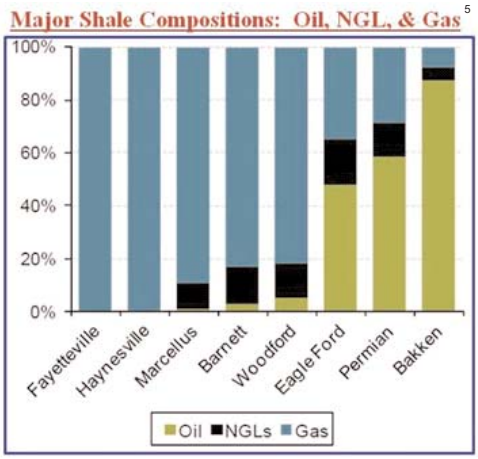
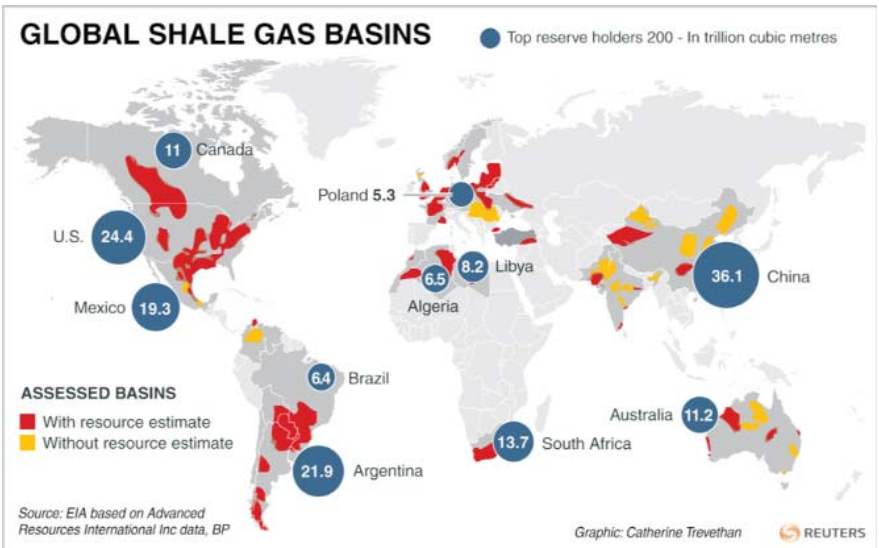


A Look at the World's Largest Shale Gas Deposits



[4] "5 Hidden Oil Shale Plays for 2013," www.seekingalpha.com (accessed January 2, 2013)

[5] Ibid.

[6] Asjylyn Loder, "Fracking Pushes U.S. Oil Production to Highest in 20 Years, "Bloomberg.com, January 9, 2013

[7] Ibid.

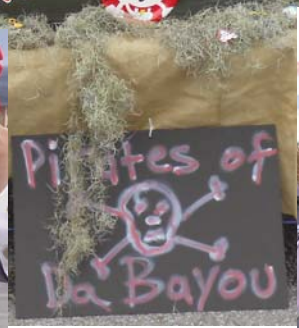
[8] Lina Roger, "A Story of Contrasts in U.S. Oil Market," ABO (About Oil), January 2013

NELSON PARTICIPATES IN THE UNIVERSITY OF NEW ORLEANS' ANNUAL CRAWFISH MAMBO

For the first time NELSON sponsored three employee teams from our New Orleans office who participated in the University of New Orleans' (UNO) Second Annual Crawfish Mambo Cook-off. This event was held as a fund raiser for the UNO Alumni Association. In addition to cooking several dozen sacks of crawfish, each team was requested to create a name and theme for their booth, and we were very proud to have one of our teams, "The Pirates of Da Bayou" awarded with the "Best Booth" award.

A fun day of all-the-crawfish-you could eat and great New Orleans Music was enjoyed by all.

Ben, Eli, Anabel, Charles Nelson and Justin celebrating their award for Best Booth.



Pirates of Da Bayou

Kenny Leveque, Ben Overstreet, Anabel Salinas (Team Captain), Eli Gunesebakan and Justin Bertheaud

Bill Landry with Rockin' Dopsie, Jr.

Geaux'n Fur Da Crawdaddy's Team

Martin Patterson, Casey & Leanne Geohegan, Bill Landry (Team Captain) and Laren Tushim

The Nelson Berlin' Team

Garry and Angela Fehn (Team Captain), Brent Fehn, Diane and Woody Logan, Michelle Jones

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NEWSWORTHY NOTES FOR NELSON

Pictured from l to r: Sara Moore, PRC, Robin Young, PRC, Bill Landry Nelson House Captain and Jon Skvarka, PRC

The Preservation Resource Center (PRC) recently recognized NELSON for over 20 years of participation in the New Orleans area October Rebuild projects.

NELSON HAS BEEN RANKED IN THE MOST RECENT ENGINEERING NEWS RECORD'S (ENR) TOP MARKET OR TOP MARKET SECTOR LISTS (BASED ON 2012 REVENUE) AS FOLLOWS:

ENR Top 500 Design Firms - 181 Overall
Top 225 International Design Firms - 175
Offshore and Underwater Facilities - 8
Petroleum - 34