

The US Oil and Gas Industry in 2012: Industry Advances, Challenges and Future Solutions

Introduction and Overview:

The global oil and gas (O&G) industry is composed of a number of different companies and organizations that contribute to supplying refined products and natural gas – ranging from fully-integrated companies, to independent O&G producers, refiners and marketers, to operating companies that only perform core functions along the chain, such as exploration and refining.¹ Typical fully-integrated companies include ExxonMobil Corp., BP, ChevronTexaco, and Royal Dutch/Shell – which also happen to be the leading global O&G producers.

The top five oil producing countries in the world are Saudi Arabia, Russia, USA, Iran and China. While the top five gas producing countries are, the US, Russia, Canada, Algeria and Iran. The US itself, produces 5.4 million barrels of crude oil per day, or about nearly 2 billion barrels a year. The US imports oil from all over the world, with top five imports coming from Canada (2.1 million barrels per day/bpd), Mexico (1.2 million bpd), Nigeria (1.1 million bpd), Saudi Arabia (1.0 million bpd) and Venezuela (1.0 million bpd). World petroleum consumption is almost 84 million barrels per day. The top five consuming countries of oil in the world are the US, China, Japan, India and Russia. The average US citizen uses about 2 barrels of oil every month.²

Within the US, the O&G industry makes significant contributions to the national economy both as one of the largest employers in the nation, as well as a purchaser of goods and services. For 2007-2009 it was estimated that the US O&G industry's total employment contribution to the national economy amounted to 9.2 million full-time and part-time jobs, accounting for 5.2 percent of the nation's total employment.³ The industry's total value-added contribution to the national economy is put at over \$1 trillion, accounting for nearly 7.5% of the US GDP (in 2007).⁴

New Frontiers: A resurgence of US oil, new technologies and new global markets:

The recession of 2009 -2010 hurt energy prices and forced a re-adjustment in energy markets and energy and production (E&P) trends, yet US oil production also increased in 2009, the first time in 17 years, breaking a long decline in US oil production.⁵ While this time period saw O&G, especially smaller,

¹ Petro Strategies, Inc., Oil and Gas Industry Players overview, http://www.petrostrategies.org/Learning_Center/industry_players.htm

² American Petroleum Institute, Fast Facts, http://www.api.org/aboutoilgas/upload/API_PALM_CARD_FINAL.pdf

³ PriceWaterhouseCoopers, "The Economic Impacts of the Oil and Natural Gas Industry on the US Economy: Employment, Labor Income and Value Added", Prepared for the American Petroleum Institute, September 8, 2009 http://www.api.org/newsroom/upload/industry_economic_contributions_report.pdf

⁴ Ibid

⁵ Independent Petroleum Association of America, "2010-2011 IPAA Oil and Gas Producing Industry" report, August 2011 <http://www.ipaa.org/reports/docs/2010-2011IPAAOPI.pdf>

independent producers, struggle with a slow economy and new O&G realities (new public policy and regulatory state and federal reform, increased public interest in green energy sources, disasters such as the BP oil spill, etc.), there also appears to be a true resurgence in terms of an American energy supply capabilities.⁶

2009-2010 saw most companies, including major O&G producers remain cautious about hiring, especially given the economy and the BP Deepwater Horizon blowout and fire (which resulted in a 6 month moratorium on deep-water drilling in the Gulf of Mexico). Yet while companies also shifted jobs to onshore wells, hoping to save experienced teams, rig count rose in fact, in October 2010 was up by 635 in the US and 155 internationally, compared to the October 2009 numbers⁷. The US Bureau of Labor and Statistics show a promising and consistent trend of increase job growth in this sector from 2005 onwards.⁸

In part because of the caution to hire new workers, the industry also pulled back from working with universities and other programs in training new recruits, an initial attempt of which had begun in the early 1990's with the realization that a lack in skilled O&G labor was on the increase. HR analysts for the industry say that a return to training and mentoring young people and investing in new talent is not only a must for the industry moving forward, but an urgent step to be taken quickly. In this regard, mentoring programs for young people, to interest them in O&G, and to set them on the necessary educational path for a successful (and useful) career in the industry is something that potentially could begin as early as high school. Traditionally, when O&G has set up mentoring programs, the emphasis tends to be on a university and post-grad level, at which stage many young people have already made educational and vocation choices that may rule out careers in O&G. Some HR analysts argue that if the O&G industry mentoring began as early as in high school, young graduates may already make college-level decisions based on the hopes of one day entering the industry.

The increase in oil and gas exploration and drilling is thanks to a growing global demand for oil and gas, which has forced companies to look further and further afield, as well new technologies which allow for such exploration to even begin. This revitalization of the US O&G in particular, has resulted in an incredible job growth for the industry, even in a stagnant national economy. In fact, the six fastest-growing jobs for 2010-11, were related to oil and gas extraction, including a growing need for geological and petroleum technicians.⁹ While many of these jobs are part of the "1099 economy", contracted work still makes up for just above 50% of the industries jobs.

New technologies have also unlocked new geographic frontiers of drilling and exploration. Areas which were once considered too difficult or too dangerous to attempt explore, have opened up thanks to advances in drilling technology.¹⁰ An example is the Athabasca Oil Sands in Alberta, which will lead to

⁶ Ibid

⁷ OilCareers.com, "The 2011 Oil and Gas Hiring Outlook" report, http://www.oilcareers.com/docs/OC_WPHiringOutlookv2.pdf

⁸ US Bureau of Labor and Statistics, Industries at a Glance, Oil and Gas Extraction: NAICS 211, <http://www.bls.gov/iag/tgs/iag211.htm>

⁹ Economic Modeling and Specialists, Blog article: "The Explosion of Oil and Gas Extraction Jobs", June 7, 2011 <http://www.economicmodeling.com/2011/06/07/the-explosion-of-oil-and-gas-extraction-jobs/>

¹⁰ OilCareers.com, "The 2011 Oil and Gas Hiring Outlook" report, http://www.oilcareers.com/docs/OC_WPHiringOutlookv2.pdf

further oil sands development in Canada and is expected to add 343,000 new U.S. jobs and \$34 billion to the GDP by 2015.¹¹ According to the American Petroleum Institute (API), The Canadian Energy Research Institute's recent study on the Canadian Sands development, forecasts that for every two jobs created in Canada from oil sands development, one is created in the U.S. In fact the API believes that the oil sands development could result in 600,000 jobs by 2035.¹²

As drilling in deeper waters becomes more and more necessary for international and national oil companies to meet the production of hydrocarbons necessary to satisfy increasing global energy demands, a larger portion of the world's oil and gas production will come from water depths greater than 4,000 feet. Historically, 65% of subsea drilling existed in what is known as the "Golden Triangle" of West Africa, Brazil, and the US Gulf of Mexico, with the North Sea, seeing a decline in drilling.

New technology has further allowed this type of extraction from such depths that were considered unthinkable even a decade ago. New geographic frontiers such as further undersea fields off Brazil, the Falkland Islands and New Zealand, and off the coast of East Africa, the Black Sea and Caspian Sea, Surinam, Australia and even deep waters off China and Cuba are now accessible¹³. This exponential increase in sub-sea exploration and drilling is forecasted to continue driving up job growth in the foreseeable future, as well as specifically increase the need for O&G sub-sea expertise.¹⁴ A sign of the increase in sub-sea exploration and drilling is that overall spending on subsea trees, controls and manifolds is expected to exceed \$15 billion by 2015.¹⁵

Latin America is set to potentially become new regional oil and gas exporter. Production is on the decline within the more established oil producers such as Argentina, Ecuador and Mexico, and instead growth will be driven in the coming decade by a two-tiered group of "rising stars" that hope to lead the region forward.¹⁶

In the top tier are Brazil and Venezuela, followed by Peru and Colombia. The latter two nations have recently caught the eye of international investors. Latin America in general stands in a good way to become a leading region of oil exports, as output is set to outpace consumption, allowing the region to

¹¹ American Petroleum Industry, Fact Sheet: Oil from Canada and Oil Sands development in Canada, http://www.api.org/~media/Files/Oil-and-Natural-Gas/Oil_Sands/Oil-from-Canada-Fact-Sheet.ashx

¹² Ibid

¹³ Exploration and Production Magazine, "Subsea Tree Market Set for Exponential growth", February 17, 2012, http://www.epmag.com/Production-Field-Development/Subsea-Tree-Market-Set-Exponential-Demand-Growth_96394

¹⁴ Ibid and Oil and Gas –Next Generation, Issue 4, <http://www.ngoilgasmena.com/article/Going-subsea/>

¹⁵ Ibid (Oil and Gas)

¹⁶ OilVoice, "Review: The Latin American Oil Industry - Out With The Old, In With The News...", February 2, 2012 http://www.oilvoice.com/n/Review_The_Latin_American_Oil_Industry_Out_With_The_Old_In_With_The_News/5851a0ece2f0.aspx

have plenty of surplus to take care of its own oil-based energy needs as well as to export for profit across the globe.¹⁷

Latin American oil supply in 2010 averaged 9.915mn bpd, with 10.24mn bpd expected in 2011 thanks largely to Brazil and Colombia. By 2015, it's forecasted that Latin America will be pumping an average 12.41mn bpd - up 25% from 2010 – a combined total from Brazil, Colombia, Peru and Venezuela.¹⁸ In this regard, as the developing world markets continue to open up to O&G, not only as consumers but producers as well, the need for a wider variety in the demographics and language and cultural skill set for O&G labor continues to grow. Spanish and Portuguese language skills in particular take on a greater importance in the future of O&G

The Challenges Ahead:

State Intervention and National Oil Companies (NOCs):

One of the main challenges facing the O&G industry is not the lack of places to explore or drill, as is the common understanding, but instead the continued rise of nationalized oil and gas companies and state intervention.

This trend of state intervention is particularly obvious in Latin America, where although all signs appear to forecast growth (see above), for producers and explorers alike, government intervention has slowed down foreign investment interest. A string of South American nations such as Venezuela, Bolivia and Ecuador have seen increased government intervention, which has led to a reduction of foreign investment, capital and resources.¹⁹ ExxonMobil's decision to pull out of Venezuela completely is one such example.²⁰

In most cases, existing foreign investors and O&G companies have started to reduce their production levels across those Latin America states where government intervention is on the rise. Such a case is Mexico, where although tentative reforms are being made, strict controls on foreign participation in the country's O&G industry, continue to hold back investment needed to stem the country's declining production levels.²¹

¹⁷ Real Instituto Elcano, "Oil and gas in Latin America. An analysis of politics and international relations from the perspective of Venezuelan policy", Genaro Arriagada Herrera, Working Paper, October 2006

¹⁸ OilVoice, "Review: The Latin American Oil Industry - Out With The Old, In With The News...", February 2, 2012 http://www.oilvoice.com/n/Review_The_Latin_American_Oil_Industry_Out_With_The_Old_In_With_The_News/5851a0ece2f0.aspx

¹⁹ Real Instituto Elcano, Genaro Arriagada Herrera, "Oil and gas in Latin America. An analysis of politics and international relations from the perspective of Venezuelan policy", Working Paper, October 2006

²⁰ International Business Times, Commodities and Futures, "Venezuela to End all ventures with ExxonMobil", March 16, 2012, <http://www.ibtimes.com/articles/315386/20120316/exxon-mobil-venezuela-hugo-chavez-nationalize-refinery.htm>

²¹ OilVoice, "Review: The Latin American Oil Industry - Out With The Old, In With The News...", February 2, 2012 http://www.oilvoice.com/n/Review_The_Latin_American_Oil_Industry_Out_With_The_Old_In_With_The_News/5851a0ece2f0.aspx

The outlook is brighter in some of the regions emerging oil sectors though. Deep water discoveries as discussed earlier are drawing huge levels of exploration investment into Brazil and, although there are concerns that state-run Petrobras is stretching itself too thin, the country is set to see huge production growth. Newcomers such as Peru and Colombia, though with more modest resource potential, have attracted international investment by putting in place attractive fiscal regimes, and maintaining low level state intervention.²²

In terms of national oil companies (NOCs), the major oil companies are slowly losing their strength in recent years due to the increasing power of NOCs, especially in the Middle East. The modern major oil companies that control 6% of world reserves today are ExxonMobil, BP, ChevronTexaco, RoyalDutch Shell, Total and ConocoPhillips, and their annual turnover exceeds GNP of many nation-states. The main goal of the NOC's is to defend their national interests through maintaining security of supply and controlling production rates. The leading world NOCs are the National Iranian Oil Company (Iran), Saudi Arabian Oil company (Saudi Arabia), Qatar General Petroleum Corporation (Qatar) and the Iraq National Oil Company (Iraq). Generally, the major oil companies tend to achieve a dramatically higher return on capital than NOC's of the same size and stature. Many NOCs are in the process of reevaluating and adjusting their business strategies. The consequences of this shift have seen several NOCs maneuvering for strategic resources in the Middle East, Eurasia and Africa, and in some cases even supplanting the major western companies out of important resource development projects.²³ This shifting political landscape is expected to influence the O&G industry in years to come and potentially alter the power of leading players, affecting hiring patterns as well as decisions as to where new exploration and drilling may occur, and ultimately negatively affecting US energy security policy.

“Big Crew” Change and Skills Shortage:

Another of the most urgent and important challenges currently facing O&G, especially given the exponential growth in global exploration and drilling, is a huge shortage of skilled labor.²⁴ The last few years have seen the mainstay of the oil- and gas industry workforce retiring or starting to retire. The retirement of this workforce in the O&G industry is referred to as “the big crew change”. People in the O&G sector normally retire at the age of 55. Since the average age of an employee working at a major oil company or service company is 46 to 49 years old, there is expected to be a huge change in personnel in the coming decade.²⁵

In addition, a number of factors have led to an overall decrease in skilled labor even available for the O&G sector. One particular reason for shortage in labor is the growing need for technical expertise which is not being matched by leading US universities, especially in chemical and electrical engineering. Geophysicists, geochemists, geologists, mathematicians, subsea specialists are also in high demand – all

²² Ibid

²³ The James A Baker III Institute for Public Policy, Rice University, “The International Oil Companies”, Jaffe and Soligo, November 2007 http://www.bakerinstitute.org/programs/energy-forum/publications/energy-studies/docs/NOCs/Papers/NOC_IOCs_Jaffe-Soligo.pdf

²⁴ Oil and Gas – Next Generation, “Bridging the Talent Gap” Issue 5, <http://www.ngoilgas.com/article/Bridging-the-talent-gap/>

²⁵ The Oil Drum: Europe Blog, “The Big Crew Change: Turnover in the Oil Workforce”, March 2007 <http://www.theoil Drum.com/node/2369>

majors that the western world is lagging behind in producing enough of to meet growing needs across many industries, not only O&G. According to a 2007 Booz Hamilton report, there has been a significant drop in numbers of students focusing on petroleum engineering (across 17 US universities) vs. the 1990s, where there were more than 34 US universities with focus on petroleum engineering.²⁶

And more and more, other US and global industries are acting as catchalls for graduates in the sciences and engineering. While O&G is known to pay well, with average contractor salaries around \$95,000 for those working locally and more than \$168,000 for imported labor (to the UK, North America and other parts of Europe. Salaries for the Middle East differ widely based on job position), the work is often difficult and dangerous²⁷. The areas of operation are often quite desolate or in less than convenient countries and the hours are demanding. The industry itself offers up other hurdles, such as the trend to usually only higher people with expertise and work experience, and not that many 'fresh' graduates. This usually ensures that recent competitive graduates move into other well-paying fields, which they are reluctant to leave unless necessary for O&G.²⁸

Lastly, O&G suffers from two major public relations issues. On one hand the industry is considered "dying" and not forward thinking or socially and environmentally conscious. Though the large O&G companies, such as ExxonMobil and Shell have tried hard²⁹ to alter this image via various new developments and extensive community and company partnerships in developing countries, and a number of small and independent producers attempt to be environmentally conscious, such disasters as the BP Deepwater Horizon fire have set back the industry's image of security, safety and environmental consciousness even further. Many experts and managers in the industry agree that enhancing the reputation of the oil and gas industry is the key to attracting new graduate recruits in particular, along with those on professional programs.³⁰

Secondly, the industry workforce is generally considered to be homogenous with mainly male (and European or American) employees.³¹ O&G has tried hard to change their hiring patterns, especially with the growing number of female engineering and science graduates.³² Yet, hiring women and minorities has been difficult. The industry also needs to adapt the corporate culture, job content and work methods more to the interests of a younger generation, providing a greater sense of purpose to the work, more

²⁶ Ibid and Booz Allen Hamilton, Parry, Waterlander, and Davidson, "Resourcing the Challenges of Maturity: An Oil Industry View white paper, 2005

²⁷ Hays Recruiting Experts in Oil and Gas, slideshow "The Oil and Gas Global Salary Guide 2010", <http://www.slideshare.net/Victorslideshare/complete-oil-gas-global-salary-guide-2010>

²⁸ Ibid

²⁹ Strategy Business.com, "Crisis in the Oil and Gas Industry", November 2006, <http://www.strategy-business.com/article/li00003?pg=0>

³⁰ Oilcareers.com, "Oilcareers.com urges oil and gas sector to tackle the skills shortage issue", <http://www.oilcareers.com/onstream/2011/09/30/oilcareers-com-urges-oil-gas-sector-tackle-skills-shortage-issue/>

³¹ Centre de Recherches des Entreprises et Sociétés (CRES), Peek and Gantes, "Whatever Happened to the Skills Crisis in the Oil and Gas Industry", July 2009, <http://www.cres.ch/Talent%20and%20Technology.pdf>

³² Ibid

open social networks (less an “old boys club”) and a favorable work/life balance.³³ Additionally, hiring consultants feel that if companies invest more time in raising awareness of the opportunities available in the sector – showing that jobs are not just limited to rig work, then this could help to resolve future skills gaps.³⁴

Policy Recommendations:

Dealing with NOCs and State Intervention/Political Uncertainties:

Ranked on the basis of oil and gas reserve holdings, fourteen of the top twenty O&G companies in the world today are national oil companies (NOCs) or newly privatized national oil companies. This trend of increased state interventions and growing NOCs presence and spheres of influence not only affect the O&G industry and in particular, US and Western European oil and gas companies, but also have larger security and geopolitical implications.

One solution to what is considered “big oil’s big problem”, is a refocusing of exploration and drilling on the Western hemisphere. Driving the change is the boom in “unconventionals” - the tough kinds of hydrocarbons like shale gas and oil sands that were once considered too difficult and expensive to extract and are now being explored on an unparalleled scale from Australia to Canada, thanks to new technology.

The U.S. is at the forefront of the unconventionals revolution. By 2020, shale sources will make up about a third of total U.S. oil and gas production and the U.S. is expected to be at the top global oil and gas producer, surpassing Russia and Saudi Arabia.

With more crude being produced in North America, there's also less likelihood of Middle Eastern politics causing supply shocks that drive up gasoline prices, as has historically occurred. This change is reshaping the oil companies themselves, as they reallocate their vast resources to new areas and new kinds of fuel. Working in the rich world—with its more predictable taxes and investor-friendly policies—removes some of the risks about the big oil companies that worry investors, making them less vulnerable to the resource nationalism of petro-states like Russia and Venezuela. Such a continuing of refocusing of interest, investment and exploration could have far-reaching ramifications for the politics of oil, potentially shifting power away from the OPEC toward the Western hemisphere. The major players face a choice, they can either invest in oil that is easy to produce but located in politically volatile countries, or they can seek opportunities in stable countries where the oil is hard to extract, requiring complex and expensive production techniques.

Another solution is having the US government and US major oil companies work closer together to play an almost NOC role on an international level, namely, calling upon US foreign affairs and government actions to:

1. Promote and enforce bilateral and multilateral trade agreements (as a regular NOC would have its government do);

³³ Ibid

³⁴ Ibid

2. Use foreign aid in new oil and gas producing regions to promote social and economic development as needed;
3. Encourage transparency and governance in oil and gas producing regions via the World Bank and the Asian and African Development Banks;
4. Continue to foster a comprehensive domestic national energy policy, focusing on new, alternative energy sources as well as unconventional and traditional sources.

No US major, nor any other US based O&G calls for, nor requires an actual US NOC forming, for this of course would undermine competition in the market place, which is the very thing driving and improving US O&G compared to many of its counterparts in other nations. But, what US O&G ideally would like is a closer and more beneficial understanding with US government in terms of promoting US O&G interests abroad, in essence, as a way to protect US energy security needs for the future.

Comprehensive and Long-Term management of the Skills Shortage:

To further its chances of developing new exploratory technologies as well as improving existing drilling possibilities, it is understood that the O&G industry must deal head-on with its skills shortage issue. A number of possible ways to deal with both a skills shortage and a hiring hesitancy are presented below for the O&G industry.

One direct route is for both major and independent O&G companies to start their hiring employees earlier in their careers, rather than the current, traditional practice, of hiring already experienced individuals. While it is beneficial for employees to have had some work experience, O&G could start off by increasing its collaboration with universities and mentorship programs to ensure that young graduates have a better understanding of what a career in O&G can offer, as well as gaining some petroleum experience while still in school.³⁵ The major players such as ExxonMobil and BP have already started putting such training programs in place in partnership with leading universities, yet many hiring experts suggest that these steps are too little, and such programs should be extended further afield, to include middle-tiered schools as well as non-conventional recruitment arenas.³⁶

Additionally, increased emphasis on mentorship programs, such as actively working with educational and community foundations could encourage the next generation to consider O&G even before reaching college level (and influencing ones academic path/choices). Mentorship programs showing young people the opportunities, both in terms of what O&G offers in terms of rewarding careers (making a difference), that pay well and allow for a global access, in late high school years would encourage a generation to consider the necessary college/undergrad paths needed to even enter O&G at a later date. Part of this is having a more “open social network”, rather than keeping O&G a closed shop.

Another suggestion put forward by hiring experts is that O&G should consider shifting away from its traditional hiring pool, and actively try and mentor and recruit women and minorities. This “non-conventional” hiring must become the convention to end the skills shortage. Programs targeting these

³⁵ Hays Recruiting Experts in Oil and Gas, slideshow “The Oil and Gas Global Salary Guide 2010”, <http://www.slideshare.net/Victorslideshare/complete-oil-gas-global-salary-guide-2010>

³⁶ Ibid

groups should be part of most O&G companies, ensuring that the new generation of engineers and scientists hold a different view of what constitutes the O&G workforce.³⁷

Within the US, some of O&G's most specific places of drilling, exploration and largest investments are in the South, Southwest and the Western part of the country, where a burgeoning Latino demographic exists. This particular demographic, is not only relatively young (by national standards), but growing in number, and in cultural clout and political clout. Political analysts see complete changes to the voting map based on these new power dynamics, and O&G would benefit as an industry on the whole, to tap into this new powerhouse of talent. And, especially as the US looks to new markets in Latin and South America, these first and second generation Americans, not only speak English but Spanish as well, and often still hold cultural ties with many of the countries US O&G are currently and hoping to do business in. This demographic of young Latinos and Latinas still remains greatly untapped and working with such youngsters from high school onwards, could in the long-run provide O&G with a surplus of highly skilled and necessary labor.

Although it may be difficult to get there, the goal is simple: find a better way to manage the industry's most valuable asset — its talent. If companies can continue to build partnerships with universities, invest in new recruits via company-funded training programs, and overhaul current human resources practices, it will be possible to avert another labor crisis before it begins.³⁸

Conclusion:

While O&G has a number of challenges facing it, its exponential growth and increased global presence is a sign of the continued vibrancy of this sector, as well as its ability to re-invent itself. The changing face of the petro-chemical world also allows for the industry to take stock of where it is and put into place some lasting and beneficial changes, particularly in terms of dealing with hiring and skill shortages.

One this is for certain, the O&G industry is seeing a resurgence and opportunities within the industry abound for the new generation of engineers and scientists.

Author: Latino Educational Fund

The Latino Educational Fund's mission is to provide young people with the resources necessary to obtain advance education and the financial knowledge to strive for a better life. The LEF focuses on providing services in four key areas:

- 1) Scholarships for students in need;
- 2) Career development and direct industry mentoring for young people;
- 3) Financial literacy to communities; and
- 4) Public policy initiatives and research reports for various industries.

³⁷ Oilcareers.com, "Oilcareers.com urges oil and gas sector to tackle the skills shortage issue", <http://www.oilcareers.com/onstream/2011/09/30/oilcareers-com-urges-oil-gas-sector-tackle-skills-shortage-issue/>

³⁸ Strategy Busines.com, "Crisis in the Oil and Gas Industry", November 2006, <http://www.strategy-business.com/article/li00003?pg=0>