INTERNATIONAL TRADE ADMINISTRATION

2016 Top Markets Report
Upstream Oil and Gas Equipment

A Market Assessment Tool for U.S. Exporters

May 2016

U.S. Department of Commerce | International Trade Administration | **Industry & Analysis (I&A)**

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Julius Svoboda and **Victoria Yue** served as lead authors of this report. A special note of thanks goes to **Adam O'Malley, Man Cho, Evan Fowler, Julian Richards, and Maren Wenzel** who contributed to the study.

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Executive Summary

Over the past 18 months, the world has seen the price of crude oil drop by more than 75 percent as a result of high production by the Organization of Petroleum Exporting Countries (OPEC), the United States and Russia. At the same time, natural gas prices in the United States have dropped below $2 per mm Btu and have been decreasing in countries around the world. While there has been significant growth in the global oil and gas (O&G) market over the previous decade, recent price declines are a result of increased global production coupled with slowed growth in the rate of energy demand. This is one of the most dramatic changes the sector has experienced in decades, and the impacts to the U.S. O&G sector are still developing. The challenge for O&G companies and their suppliers is to find ways to decrease costs and maintain revenues in this low price environment. In such a tight market environment, it can be difficult to see the opportunities in the face of a multitude of challenges.

ITA's *2016 Upstream Oil and Gas Equipment Top Markets Report* ranks 74 markets based on export potential for U.S. O&G equipment through 2019. The report is designed to provide market intelligence to U.S. companies, as well as provide trade policy information for policy-makers to identify upstream O&G markets where U.S. Government (USG) resources can make the biggest impact in support of increased U.S. equipment exports. Markets ranked highly by ITA represent those countries with significant potential for increased U.S. O&G equipment exports. The *2016 Upstream Oil and Gas Equipment Top Markets Report* looks at the export opportunities for the U.S. O&G equipment sector in 10 strategic markets with additional information on Russian sanctions, emerging offshore opportunities and frontier markets in unconventional O&G.

Market Analysis

To determine market rankings, the *2016 Upstream Oil and Gas Equipment Top Markets Report* employed a modified "score card" analysis that grouped countries with greater or lesser amounts of opportunities for increased exports from the United States. The score card methodology used in this study employed qualitative and quantitative indicators to measure future opportunity for exports from the United States. Indicators included are:

1) Proximity of a country to the United States;
2) U.S. export trends for O&G field equipment;
3) The U.S. share and the market size of a country's O&G equipment imports;
4) A country's future natural gas and oil production and reserves;
5) Total upstream project investments in the country (as publicly available);
6) An institutional risk assessment variable;
7) An overall business environment variable; and
8) A qualitative ranking of the country as an export destination.

This report evaluates the following markets in greater detail: Argentina, Brazil, China, Iraq, Mexico, Nigeria, Norway, Oman, Saudi Arabia and Singapore. ITA chose markets that offer potential opportunities for increased exports of upstream O&G equipment where there is a strong need for USG engagement. Some of these countries may be more challenging markets for U.S. exporters and do not appear on ITA's list of top 30 export markets for upstream O&G equipment [see Figure 1]. This is because higher rankings do not necessarily indicate markets with the greatest need for USG engagement or where U.S. companies are otherwise limited in their ability to sell O&G

Figure 1: Top 30 Upstream Oil & Gas Equipment Export Markets

1.	UAE	7.	Brazil	13.	Argentina	19.	Iraq	25.	Nigeria
2.	Canada	8	Norway	14.	China	20.	Russia	26.	South Korea
3.	Australia	9.	United Kingdom	15.	Indonesia	21.	Peru	27.	Israel
4.	Mexico	10.	Ghana	16.	Kuwait	22.	Oman	28.	India
5.	Saudi Arabia	11.	Singapore	17.	Chile	23.	Ecuador	29.	Thailand
6.	Colombia	12.	Malaysia	18.	Venezuela	24.	Angola	30.	South Africa

equipment by foreign government measures– i.e., where the USG has a relatively important role in creating export opportunities.

Each country has different challenges and opportunities, so business leaders will need to evaluate the strengths and weaknesses of exporting to and initiating projects in a target country. At the same time, policy-makers will also need to adapt commercial and policy strategies to address foreign trade barriers in the O&G sector. ITA believes that by evaluating a country's market size, resource endowment and investment climate, appropriate strategies become clear. In particular, ITA notes that policy-makers and exporters alike should consider the risk and potential reward associated with each market. The country case studies in this report were selected based on their commercial opportunity and trade policy environment.

U.S. Competitiveness in the Upstream O&G Sector

In the years ahead, ITA projects world exports of O&G equipment to increase but with limited growth in 2016. Today, the United States is the world's third largest exporter of upstream O&G equipment, with close to $23 billion in exports to the world. In some strategic markets, U.S. exporters face local content requirements, local labor requirements and other trade restrictions, increasing costs and reducing competitiveness of U.S. exports.

It is important for policy-makers to consider the nuances of the O&G industry when evaluating international opportunities for U.S. O&G equipment suppliers. The O&G equipment industry includes a wide variety of products, and thus, the export profile of the United States varies considerably relative to other markets. Some markets that are long established O&G producers demand capital-intensive, high-tech seismic and drilling equipment, while other markets that have just discovered O&G resources seek to import conventional drilling equipment and services for infrastructure development.

U.S. O&G equipment suppliers face strong competition from Chinese and South Korean O&G equipment manufacturers. In comparison, U.S. exports are particularly competitive in high-end sinking and boring parts and parts for derricks, whereas South Korean exports are concentrated in vessels with derricks with few sinking or boring parts, and Chinese exports are concentrated in vessels with drilling platforms and equipment and pipe. These trends will likely continue with U.S. exports weighted more toward specialized high-tech equipment, especially relating to unconventional and ultra-deepwater O&G exploration and production.

The projected increase in demand for U.S. exports of O&G equipment through 2019 may be further driven by the fundamental changes in U.S. O&G production during the last several years. Having been among the first in the world to develop unconventional and ultra-deepwater resources, U.S. equipment manufacturers and service suppliers have the opportunity to seize the first-mover advantage in overseas markets that are seeking to emulate the United States' rapid expansion in energy production.

While the United States may be competitive in the O&G equipment sector, the share of U.S. equipment being exported to the global market (as a proportion of world O&G equipment exports to the global market) has declined. This may be a demonstration of greater consumption of U.S. equipment within the U.S. O&G sector, but this is also a reflection of greater competition from foreign equipment producers, as other countries have increased the proportion of equipment exports to the global market at the same time. While U.S. export figures remained relatively flat from 2012 to 2013, the share of U.S. exports to the global market (as a proportion of total world exports) increased. In absolute terms, U.S. exports in the sector are projected to increase in the next five years. But the U.S. proportion of the overall world market for O&G equipment is projected to decrease through 2019.

Looking to the years ahead, ITA sees that the low price of oil and gas across the board has decreased investment plans. Companies and policy-makers should anticipate the O&G sector to face stiff competition for new business.

Overview and Key Findings

Introduction

Over the past 18 months, the world has seen the price of crude oil drop by more than 75 percent as a result of high production by the Organization of Petroleum Exporting Countries (OPEC), the United States and Russia. At the same time, natural gas prices in the United States have dropped below $2/mm Btu and have been decreasing in countries around the world. While there has been significant growth in the global oil and gas (O&G) market over the previous decade, recent price declines are a result of increased global production coupled with slowed growth in the rate of energy demand. This is one of the most dramatic changes the sector has experienced in decades, and the impacts to the U.S. O&G sector are still developing. The challenge for O&G companies and their suppliers is to find ways to decrease costs and maintain revenues in this low price environment. In such a tight market environment, it can be difficult to see the opportunities in the face of a multitude of challenges.

ITA's *2016 Upstream Oil and Gas Equipment Top Markets Report* ranks 74 markets based on export potential for U.S. O&G equipment through 2019. The report is designed to provide market intelligence to U.S. companies, as well as provide trade policy information for policy-makers to identify upstream O&G markets where U.S. Government (USG) resources can make the biggest impact in support of increased U.S. equipment exports. Markets ranked highly by ITA represent those countries with significant potential for increased U.S. O&G equipment exports. The *2016 Upstream Oil and Gas Equipment Top Markets Report* looks at the export opportunities for the U.S. O&G equipment sector in 10 strategic markets with additional information on Russian sanctions, emerging offshore opportunities and frontier markets in unconventional O&G.

Key Findings: Top Markets and Methodology

Top Markets

This report evaluates the following markets in greater detail: Argentina, Brazil, China, Iraq, Mexico, Nigeria, Norway, Oman, Saudi Arabia and Singapore. ITA chose markets that offer potential opportunities for increased exports of upstream O&G equipment where there is a strong need for USG engagement. Some of these countries may be more challenging markets for U.S. exporters and do not appear on ITA's list of top 30 export markets for upstream O&G equipment [see Figure 2]. This is because higher rankings do not necessarily indicate markets with the greatest need for USG engagement or where U.S. companies are otherwise limited in their ability to sell O&G equipment by foreign government measures– i.e., where the USG has a relatively important role in creating export opportunities.

Each country has different challenges and opportunities, so business leaders will need to evaluate the strengths and weaknesses of exporting to and initiating projects in a target country. At the same time, policy-makers will also need to adapt commercial and policy strategies to address foreign trade barriers in the O&G sector. ITA believes that by evaluating a country's market size, resource endowment and investment climate, appropriate strategies become clear. In particular, we note that policy-makers and exporters alike should consider the risk and potential reward associated with each market. The country case studies in this report were selected based on their commercial opportunity and trade policy environment.

Figure 2: Top 30 Upstream Oil & Gas Equipment Export Markets

1.	UAE	7.	Brazil	13.	Argentina	19.	Iraq	25.	Nigeria
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6.	Colombia	12.	Malaysia	18.	Venezuela	24.	Angola	30.	South Africa

Figure 3: Summary of Country Case Studies			
Country/ Projected 2019 Market Size	***Market Characteristics***	***Country/ Projected 2019 Market Size***	***Market Characteristics***
High Risk/High Reward		**Low Risk/High Reward**	
Brazil *$5.2 bn*	Poor fiscal terms, strict regulatory environment and ongoing corruption scandal, but strong O&G resources and significant reforms likely.	**Norway** *$4.7 bn*	Stable policy environment, favorable tax regime and high level of capital spending in O&G sector.
China *$18 bn*	Regulatory uncertainty and uncompetitive policies, but robust energy demand growth.	**Oman** *$1.4 bn*	Stable in an unstable region, favorable policies (relative to others in the region) and existing U.S.-Oman FTA, but recently increased tax rates.
Iraq *$2.8 bn*	Political instability, security concerns and limited resources to support O&G projects, but high increases in crude oil production.	**High Risk/Low Reward**	
		Argentina *$1.5 bn*	Political volatility and history of credit default, but numerous reforms as a result of new administration.
Nigeria *$1.7 bn*	Regulatory issues, security concerns and corruption, but significant reforms expected to meet investment needs.	**Mexico** *$6.9 bn*	Historic energy reforms and reasonable regulatory and fiscal terms, but troubled national oil company.
Saudi Arabia *$7.7 bn*	Strained economy and vulnerable infrastructure, but strong push for shale and deepwater resource production.	**Low Risk/Low Reward**	
		Singapore *$9.5 bn*	Regional hub for O&G equipment trade and transparent business practices, but declining product demand in region due to low oil prices.

Methodology

Ample data exist to analyze upstream O&G exploration equipment, allowing detailed export and import projections and trends through 2019. The analysis in this report relies primarily on U.S. export data to support the policy recommendations.

To determine market rankings, the *2016 Upstream Oil and Gas Equipment Top Markets Report* employed a modified "score card" analysis that grouped countries with greater or lesser amounts of opportunities for increased exports from the United States.

The score card methodology used in this study employed qualitative and quantitative indicators to measure future opportunity for exports from the United States. Indicators included are:

1) Proximity of a country to the United States;
2) U.S. export trends for O&G field equipment;
3) The U.S. share and the market size of a country's O&G equipment imports;
4) A country's future natural gas and oil production and reserves;
5) Total upstream project investments in the country (as publicly available);
6) An institutional risk assessment variable;
7) An overall business environment variable; and
8) A qualitative ranking of the country as an export destination.

For each of the major export opportunity indicators, the quantitative information was ranked and then re-grouped into quartiles for each of the 74 key countries involved in upstream activities. The "score" for each indicator was an average of the quartile ranking across the sub categories, which were then summed and weighted for a final score. Using quartiles allows for relative rankings rather than absolute rankings; that is, the rank is an indicator showing whether the export opportunity indicator is a high (quartile rank 4), medium high (quartile rank 3), medium/low (quartile rank 2) or small/low range (quartile rank 1). Analyzed as a whole, this approach allows the top prospective markets across multiple "best" categories to rise to

the top. (see Appendix I: Methodology, for greater detail of the methodology)

Caveats

The *2016 Upstream Oil and Gas Equipment Top Markets Report* focuses on upstream U.S. O&G equipment exports to draw larger conclusions about the nature of the global O&G sector as a whole. As export data on services is neither readily available nor consistent across markets, trade statistics for O&G equipment are used as a proxy indicator for services exports. If a country imports O&G equipment, it will likely have associated trade in services related to O&G exploration and production as well. The report utilizes 2015 trade data, when available (i.e, U.S. export figures), and uses 2014 trade data to analyze global imports. ITA projections for U.S. exports and global imports do not take into account price-based forecasting.

The report uses country data on O&G resource endowments as an indicator of demand for O&G equipment, but it does not evaluate international trade in crude oil or natural gas. The U.S. government promotes the export of equipment and services related to O&G exploration, production, transportation, refining and storage.

This analysis also does not fully take into consideration the recent fluctuations in the international price of oil and its impacts on the O&G sector. While the price of crude oil will impact a company's investment decisions, this report employs historical data to analyze global exports of equipment and current O&G resource endowments. Trade data was adjusted to consider the current low price environment where possible, and U.S. export and global import market projections for 2015 and 2016 (when actual 2015 figures were unavailable) were reduced to reflect expected market changes.

Case Studies

Ten countries were identified from the top 30 for greater analysis: Argentina, Brazil, China, Iraq, Mexico, Nigeria, Norway, Oman, Saudi Arabia and Singapore. Russia is included to provide additional context on ongoing energy sanctions. The markets in the *2016 Upstream Oil and Gas Equipment Top Markets Report* represent a range of opportunities to demonstrate the typography of commercially focused opportunities in the O&G sector.

Comparison to 2015 Report

ITA's methodology to determine the greatest market opportunities for O&G equipment exports largely remains unchanged from the *2015 Upstream Oil and Gas Equipment Top Markets Report*. To strengthen the methodology for the *2016 Upstream Oil and Gas Equipment Top Markets Report*, the following modifications were made:

1) Improving the Qualitative Rating indicator
2) Addition of the Business Environment indicator
3) Standardization of the Proximity to the United States indicator quartiles
4) Inclusion of the Compound Annual Growth Rate in U.S. Exports and Import Market indicator legends
5) Revision of HTS codes for calculating O&G equipment trade

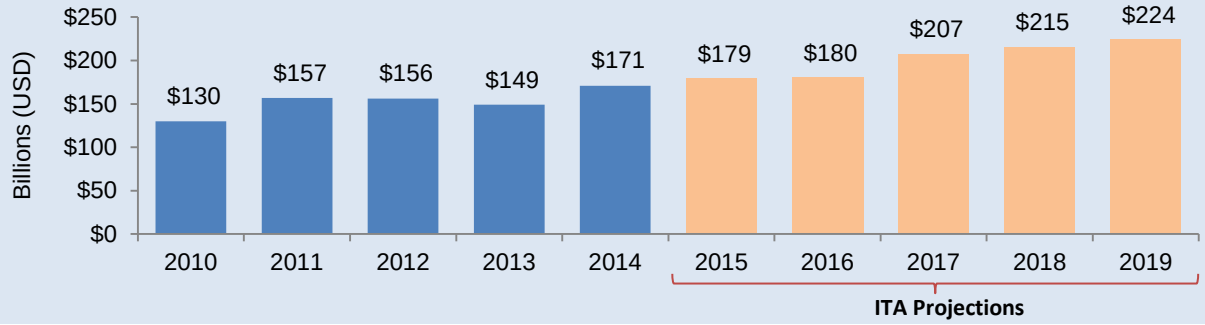
Seventy percent of the top markets identified in the *2015 Upstream Oil and Gas Equipment Top Markets Report* were again ranked in the top 20 markets in the *2016 Upstream Oil and Gas Equipment Top Markets Report*. In general, the countries which fell from the list saw moderate decreases, while those who entered the list for the first time did so through comparatively large jumps in the rankings. The majority of the changes to this year's standings can be attributed to the inclusion of the Business Environment indicator to the methodology. The inclusion of this indicator was especially impactful on emerging markets, helping large OECD countries on the list to remain in relatively stable positions (see Appendix III: Comparison to the *2015 Upstream Oil and Gas Equipment Top Markets Report* for greater detail).

Industry Overview and Competitiveness

For the purposes of this report, the upstream O&G equipment industry is defined as establishments primarily engaged in manufacture of:

1) Submersible and semi-submersible drilling platforms;
2) O&G field machinery and equipment;
3) O&G field production machinery and equipment;
4) O&G field derricks; and
5) Pipe and tube.

Figure 4: World Market for O&G Equipment



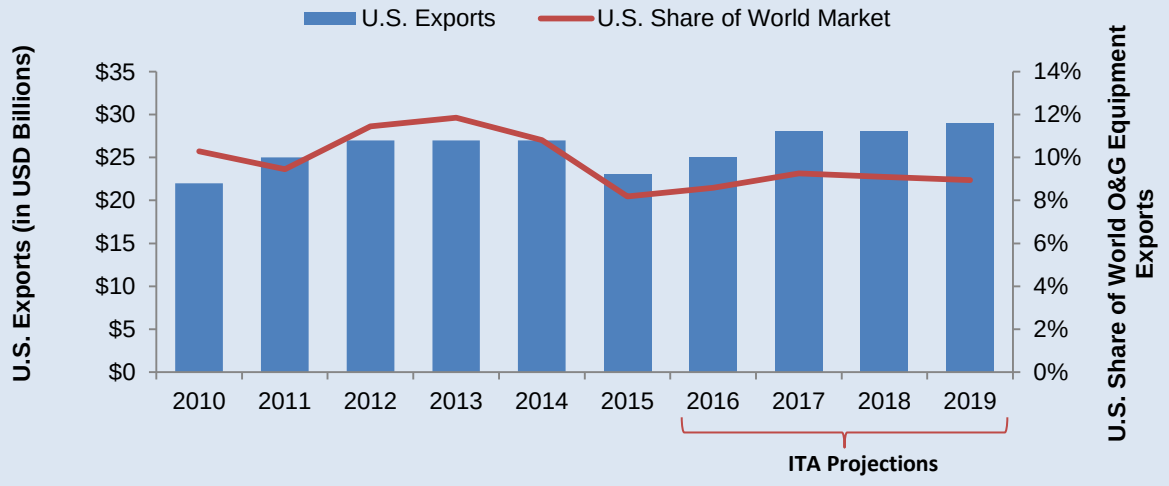
As export data on services is neither readily available nor consistent across markets, trade statistics for O&G equipment are used as a proxy indicator for services exports (see the Caveats section for further details).

The United States is home to many O&G equipment manufacturers, service suppliers and technology producers, many of which are world renowned. In fact, U.S. companies are very competitive in foreign markets and are known for both quality and service. Over the past 10 years, the global market for this industry has increased by a compounded annual growth rate of 6.5 percent, from $85 billion in 2004 to $171 billion in 2014 [see Figure 4].

It is important for policy-makers to consider the nuances of the O&G industry when evaluating international opportunities for U.S. O&G equipment suppliers. The O&G equipment industry includes a wide variety of products, and thus, the export profile of the United States varies considerably relative to other markets. Some markets that are long established O&G producers demand capital-intensive, high-tech seismic and drilling equipment, while other markets that have just discovered O&G resources seek to import conventional drilling equipment and services for infrastructure development.

U.S. O&G equipment suppliers face strong competition from Chinese and South Korean O&G equipment manufacturers. In general, U.S. exports are particularly competitive in high-end sinking and boring parts and parts for derricks, whereas South Korean exports are concentrated in vessels with derricks with few sinking or boring parts, and Chinese exports are concentrated in vessels with drilling platforms and equipment and pipe. These trends will likely continue with U.S. exports weighted more toward specialized high tech-equipment, especially relating to unconventional and ultra-deepwater O&G exploration and production.

Figure 5: U.S. Exports and U.S. Share of World Market



The projected increase in demand for U.S. exports of O&G equipment through 2019 [see Figure 5] may be further driven by the fundamental changes in U.S. O&G production in the last several years. Having been among the first in the world to develop unconventional and ultra-deepwater resources, U.S. equipment manufacturers and service suppliers have the opportunity to seize the first-mover advantage in overseas markets that are seeking to emulate the United States' rapid expansion in energy production.

While the United States may be competitive in the O&G equipment sector, the share of U.S. equipment being exported to the global market (as a proportion of world O&G equipment exports to the global market) has declined. This may be a demonstration of greater consumption of U.S. equipment within the U.S. O&G sector causing a decline in U.S. exports, but this is also a reflection of greater competition from foreign equipment producers, as other countries have increased the proportion of equipment exports to the global market. While U.S. export figures remained relatively flat from 2012 to 2013, the share of U.S. exports to the global market (as a proportion of total world exports) increased. In absolute terms U.S. export figures in the sector are projected to increase, but U.S. exports as a share of the world market are projected to decrease through 2019 from levels seen in recent years.

Global Industry Landscape

The international O&G equipment market is characterized by a large presence of heavy manufacturing for the ships and offshore platforms in South Korea, low cost inputs originating from China and high-tech components and advanced manufacturing from the United States, Germany and Japan. In 2014, South Korea was the world's largest O&G equipment exporter, exporting $36 billion to global markets, while China and the United States were the next largest O&G equipment exporters to the world with $30 billion and $27 billion in exports, respectively. In 2014, South Korea represented 15 percent of global exports; China represented 12 percent, and the United States represented 11 percent of these exports by value [see Figure 6].

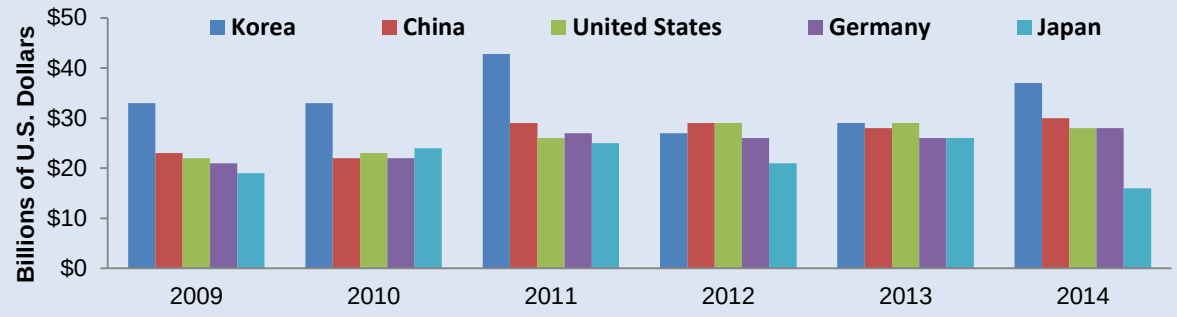
Global crude oil prices are expected to remain depressed through 2016, with the earliest increase expected in mid-2017. Until global crude oil prices return to the $50 to $60 range, new projects will be delayed and existing high-cost production will be shut-in. With international crude oil prices at the time this report was written around $40/bbl, U.S. O&G equipment suppliers will be pushed to develop new, low-cost extraction and production methods to ensure that U.S. O&G equipment is competitive in the low price environment.

Opportunities and Challenges

The O&G sector can generate large profits, but has always been characterized by a high degree of risk. O&G companies are faced by a number of risks not only related to finding oil or gas under the ground, but also financial, political and security risks that exist above ground. The *2016 Upstream Oil and Gas Equipment Top Markets Report* analyze those countries with the most potential for equipment sales against the associated risks and rewards of that country's O&G sector.

The top 20 countries from the *2016 Upstream Oil and Gas Equipment Top Markets Report* are plotted on a Risk-Reward Matrix [see Figure 7, next page], which illustrates each country's relative upstream risks and rewards. The rewards are heavily weighted toward below ground resources, while the risks are more weighted toward above ground government

Figure 6: Top 5 Oil & Gas Equipment Exporting Countries

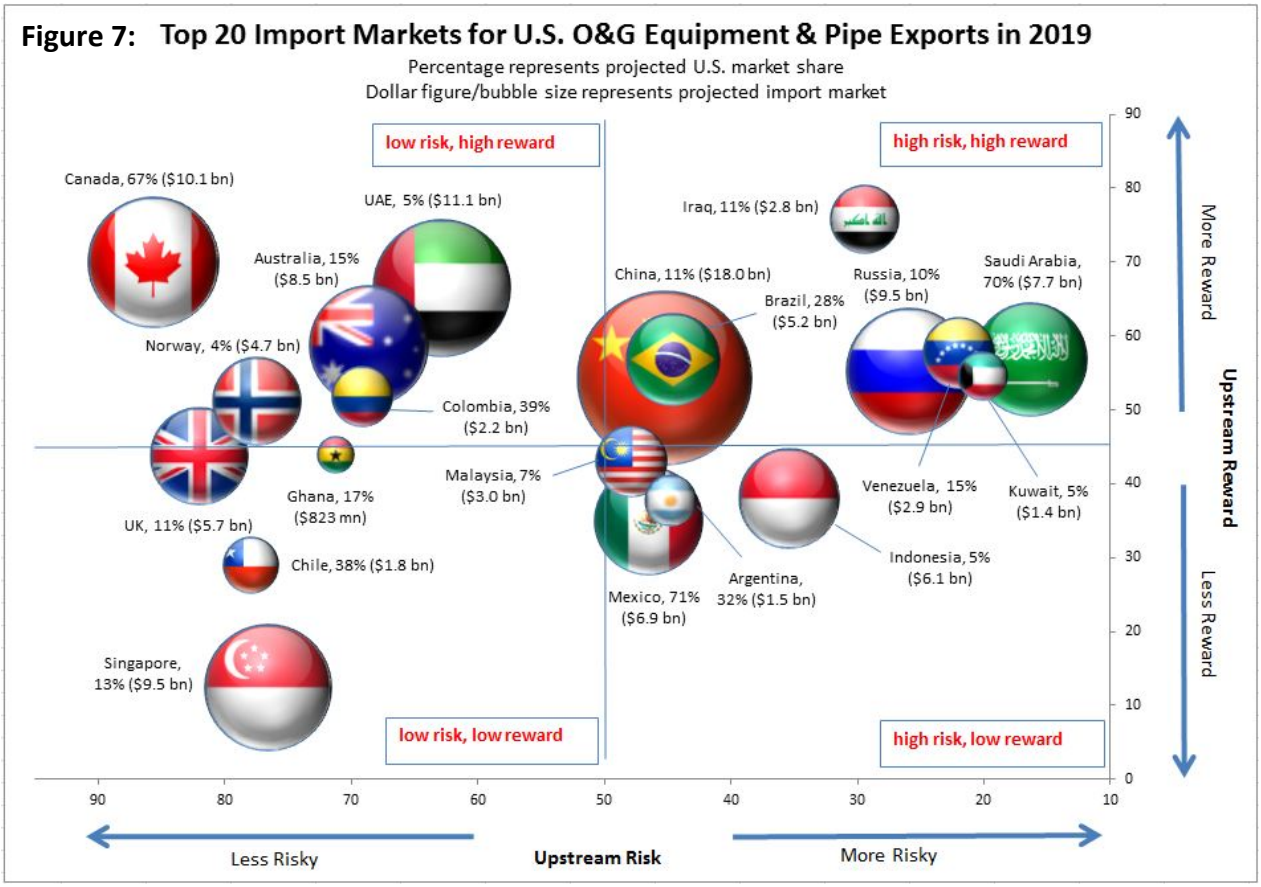


Source: UN Trade Data

policy. In a case such as Singapore, a company might encounter few unanticipated regulatory challenges (i.e. low risk), but would also have lower profits (i.e. lower reward) from investments. In contrast, a high risk, high reward country, such as Iraq, may potentially yield significant profits in the O&G equipment sector, but there are a greater number of risks (i.e. import regulations, corruption, infrastructure constraints) that companies will have to consider when conducting business there.

In the years ahead, ITA projects world exports of O&G equipment to increase but with limited growth in 2016. Today, the United States is the world's third largest exporter of upstream O&G equipment, with close to $23 billion in exports to the world. In some strategic markets, U.S. exporters face local content requirements, local labor requirements and other trade restrictions, increasing costs and reducing competitiveness of U.S. exports. Additionally, the low price of oil and gas across the board has decreased investment plans, and there will be stiff competition for new business.

Figure 7: Top 20 Import Markets for U.S. O&G Equipment & Pipe Exports in 2019



Source: ITA (Figure cites trade data from Business Monitor International, UN Trade Data, and ITA Projections)

Frequently Used Acronyms

bbl/d	barrels per day
Bcf	billion cubic feet
Bcm	billion cubic meters
BMI	Business Monitor International
CAGR	compound annual growth rate
EOR	enhanced oil recovery
FTA	free trade agreement
HTS	harmonized tariff schedule
IOC	international oil company
ISIL	Islamic State of Iraq and the Levant
JV	joint venture
LCR	local content requirements
LNG	liquefied natural gas
mbpd	million barrels per day
mm Btu	million British thermal units
NOC	national oil company
OECD	Organization for Economic Cooperation and Development
O&G	oil and gas
OPEC	Organization of Petroleum Exporting Countries
PSA	production sharing agreement
SOE	state owned enterprise
Tcf	trillion cubic feet
Tcm	trillion cubic meters
TPP	Trans-Pacific Partnership

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Sector Snapshots

This section contains sector snapshots that summarize U.S. oil and gas equipment export opportunities in each subsector. The overviews outline ITA's analysis of the export potential across each technology's supply chain and offer commentary on the relative competitive position of U.S. suppliers.

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Unconventional O&G Resources

Unconventional O&G resources, such as shale, oil sands, oil shale, tar sands or coal bed methane, are hydrocarbon baring geological formations with low permeability or porosity that cannot be developed using conventional development techniques. Unconventional O&G development uses methods such as horizontal drilling, hydraulic fracturing and in situ-types of production (commonly used for oil shale and oil sands). The exact practice of hydraulic fracturing, including the composition of the frac fluid, depends on the geologic structure, formation pressure and the well's target. Hydraulic fracturing allows O&G companies to access more difficult reserves, which has become instrumental with unconventional O&G resources.

Numerous analyses have been conducted to try to assess the extent of global shale resources, which have resulted in a range of estimates. For example, in 2013, the U.S. Energy Information Administration commissioned Advanced Resources International (ARI) to conduct a global assessment of shale gas and shale oil in 137 shale formations in 41 countries outside the United States. Although it did not utilize sub-surface data and can only provide broad estimates of global shale O&G resources, ARI's assessment indicated large potential for resource development of hydrocarbons from shale. The map below, developed by the West Virginia GIS Technical Center, depicts global shale resources, showing shale basins in light tan and shale plays in dark tan [see Figure 8].

U.S. companies have experimented with producing hydrocarbons from shale since the early 1980s. Around 2005, O&G companies increasingly began using the technique for commercial shale gas production that employed horizontal drilling and hydraulic fracturing with a mixture of water, sand and chemicals pumped at high pressures, generally referred to as "unconventional oil and gas." The amalgamation of these pre-existing techniques spurred a shift in the O&G sector that has now reversed the decline in U.S. oil and gas production, disrupting the predominant global oil and gas global market structure. This new market structure is

Figure 8: Map of Global Unconventional Oil and Gas Resources

Source: West Virginia GIS Technical Center

characterized by increased U.S. oil and gas production, global supply outstripping demand and a massive decline in global crude oil prices. The United States is now widely viewed as the "swing producer" for the world since U.S. oil and gas production hinges on global prices and can quickly increase production as crude oil prices rise.

Shale resources represent a new frontier of O&G supply in a world of increasing energy demand. Developing hydrocarbons from shale, however, requires significant amounts of both capital and human resources, pipeline and refining infrastructure, a well-developed regulatory system and access to a dynamic and experienced O&G equipment and service supply chain. In addition, the geological, structural and resource characteristics of shale formations can vary widely from formation to formation, requiring different processes and technologies to develop shale gas wells in different areas around the world. Since the O&G industry does not have a "recipe book" on how to develop a shale gas play, extensive geological resource assessment and seismic analysis is required along with specialized equipment and highly trained professionals.

Challenges Facing Unconventional O&G Development

When considering the market implications of abundant shale resources, it is important to distinguish between a technically recoverable resource and an economically recoverable resource. Technically recoverable resources represent the volumes of oil and natural gas that could be produced with current technology, regardless of oil and natural gas prices and production costs. Economically recoverable resources are resources that can be profitably produced under current market conditions. The economic recoverability of oil and gas resources depends on three factors:

1) The costs of drilling and completing wells;
2) The amount of oil or natural gas produced from an average well over its lifetime; and
3) The prices received for oil and gas production.

Recent experience with shale gas in the United States and other countries suggests that economic recoverability can be significantly influenced by "above ground" factors as well as by geology. Key above ground advantages in the United States that may not apply in other locations include private ownership of subsurface mineral rights that provide a strong incentive for development, availability of many independent operators and supporting contractors with critical expertise and suitable drilling rigs, preexisting gathering and pipeline infrastructure and the availability of water resources for use in hydraulic fracturing. In part due to the rise in U.S. production and exports of crude oil and natural gas, prices have plummeted, making unconventional drilling less attractive to firms and speculators. Other factors impacting unconventional O&G development around the world include:

1) **Regulations** – The U.S. possesses a strong regulatory framework that provides legal protection for those experimenting with new technologies, including those related to drilling and hydraulic fracturing. In many other countries, regulatory framework is set up for conventional O&G, does not meet the needs of those interested in unconventional O&G ventures, and may face challenges surrounding regulatory implementation.
2) **Private Mineral Rights** – In the United States, landowners own sub-surface mineral rights on their property, a condition that does not exist in most countries.
3) **Infrastructure** – As with conventional extraction, unconventional O&G hinges on the ability to tap into an extensive and well-maintained transportation infrastructure. This allows the resources that are being extracted to be delivered and distributed across a country. In the United States, shale gas ventures have taken off near pipelines and terminals that can transport natural gas from producing formations to market.
4) **Water** – Due to the massive need for water that will be injected into the wells, countries have to not only possess enough water but also build the logistical support and infrastructure that can deliver the necessary water to the wells for hydraulic fracturing as well as manage wastewater.
5) **Expertise** – Technical expertise on hydraulic fracturing and shale gas exploitation is centered within the United States. In a world where shale gas and shale oil development is costly and the work is uniquely tied to geological features, developing a labor force with technical expertise remains a challenge. Generating the technical expertise necessary for unconventional

development will be easier in countries with a robust conventional O&G industry than in countries with an undeveloped O&G sector.

Current Markets

To date, only the United States, Argentina, Canada and China have produced commercial volumes of either natural gas from shale deposits or crude oil from tight reservoirs. While the United States' diverse industry has formed the nucleus for its rapid growth in oil production since the mid-2000's, the low global price of oil has had a significant impact on U.S. O&G companies. At the same time, the United States remains at the forefront of the unconventional O&G revolution, leading the world in technological innovation and industry-driven regulations. As current markets continue to exploit their own unconventional O&G resources and new markets develop, U.S. companies are likely to find new avenues to export their sectoral expertise.

Argentina holds significant potential for commercial shale gas and shale oil production and could hold up to 308 Tcf of shale gas. The Neuquen Basin, located in west-central Argentina, is the epicenter of shale exploration in the country, with the Vaca Muerta shale formation possibly holding approximately 40 percent of the country's shale gas and 60 percent of its shale oil. As a net energy importer, Argentina is a bright spot for potential shale investment due to the promising geology of its basins and formations and an existing infrastructure connected to the main deposits in the Neuquen Basin. The Argentine government has continued to focus on promoting foreign investment in these projects, most notably in October 2014 with a set of reforms to the country's hydrocarbon law. Despite the promise of Argentina's sector and government attention, commercial scale shale production remains relatively undeveloped.

Canada contains several large hydrocarbon basins, holding up to 72 Tcf of shale gas. Shale resources are primarily centered in western Canada, including British Columbia, the Northwest Territories and Alberta, with smaller basins found in Saskatchewan, Manitoba, Quebec and Nova Scotia. The federal government of Canada is designated as the regulatory authority over the Canadian frontier, including the Yukon, Nunavut and the Northwest Territories, as well as the lands provided to the First Nations and certain offshore allotments. Hydraulic fracturing and onshore hydrocarbon policies are set at the province level, such as the British Columbia Oil and Gas Commission and the Alberta Energy Regulator.

China possesses the world's greatest unproved technically recoverable shale gas deposits and the third largest quantity of tight oil. China's shale resources are centered on seven basins, particularly among the South China 'shale corridor,' which encompasses the basins of Sichuan, Jianghan and Subei alongside the Yangtze Platform. Sichuan, the most prominent of those in the corridor, is well-integrated into existing infrastructure, is close to nearby water supplies and is located near major cities. In China, shale gas exploitation is under-way, with special attention given to the Sichuan basin and the Yangtze Platform. The Chinese shale industry, however, faces several hurdles, such as (1) less favorable geological conditions, including seismically active faults; (2) an inexperienced service sector; and (3) limited public data on geology and wells.

Frontier Markets

There are several other countries that possess sizeable shale deposits but have yet to develop their unconventional O&G industry. Based on estimates of shale gas deposits in Poland, a number of O&G companies began making significant investments in exploratory activities. Although companies did not find quantities of oil or gas that were feasible for commercial production after drilling several test wells, exploration for commercially-viable quantities of shale gas in Poland has continued. Despite efforts by the Polish government to encourage investment, the country's complicated geology, introduction of the Special Hydrocarbon Tax and lower global natural gas prices have all tempered expectations for a shale gas boom. In South Africa, the government has slowed the growth of unconventional development by taking years to finalize regulations on exploration activities and delaying the awarding of licenses. Similar to Poland, there have been questions as to the commercial viability of South African shale amid the downward trending price of oil and the lack of any existing gas infrastructure in the country.

There are several other markets, however, that hold abundant reserves and conditions that could foster the development of new unconventional O&G markets. Mexico and Brazil, for example, are both countries that possess significant shale oil deposits.

In addition, both countries host an existing O&G infrastructure, including the necessary human capital networks to launch large-scale unconventional operations in the country. In Mexico, geographic proximity and geological similarities to the United States could bolster opportunities for U.S. commercial engagement. In Brazil, a lack of unconventional O&G equipment and limited infrastructure around remote shale gas deposits provide U.S. companies with commercial prospects to meet these needs. Expectations though, especially in the short-term, should remain low, as unconventional O&G exploration and production across the global is limited by lower global oil prices.

Offshore Ultra-Deepwater O&G Development

The offshore O&G industry has traditionally faced numerous challenges, including higher operational costs, contractual difficulties and greater risk profiles, which have been exacerbated by lower global oil prices. Given the lengthy start-up time for offshore O&G projects, these constraints have tempered the short-term outlook for offshore crude oil production. The resulting reduction in supply will reduce margins for producers and suppliers, slow countries' offshore development aims and dissuade rapid re-entry into the market. However, companies can weather these changes by implementing long-term strategies that hedge against downturns by maintaining liquidity in capital reserves and exploring the most economically-efficient offshore markets.

Despite cost saving measure such as cold stacking, shut-in stacking and contract modifications, offshore O&G is especially vulnerable to price changes. High per barrel break-even price for offshore operations and high start-up costs makes exposure greater to the drop in oil prices. Since 2015, low global oil prices have forced IOCs to decrease investments in offshore development to reign in capital expenditure on high-cost exploration and production. The longer oil remains at its current low level,, significant shutdown and investment deferments will occur. It is estimated that from the beginning of the oil price decline in late 2014 to the end of 2015, $213 billion worth of deepwater investment has already been suspended around the world. Projections have stated that the effect of these delays will be a roughly 1.5 million bbl/d reduction in deepwater production and 500,000 bbl/d reduction in shallow water production by 2025.[i]

Cuts in exploration and production budgets are reducing interest in many foreign auctions. Recent auctions for offshore blocks have been disappointing for many nations which were previously seen as promising investment locations. In 2015, for example, Brazil sold only 37 of the 266 blocks it made available. There are opportunities for firms that still possess the liquidity to invest in countries offering more favorable terms (in order to incentivize companies to bid on blocks). Given these blocks require years of investments before becoming profitable, companies will need to plan on weathering the low oil price environment into 2017.

Market participants that are able to remain active in the sector will benefit from an oversupply of new rigs. With a multi-year average construction time, many offshore rigs under construction were contracted in an environment of higher oil prices, and some manufacturers even began to construct rigs in anticipation of future orders. Considering the overabundant supply of new rigs, rig day rates are likely to be depressed until the supply overhang is absorbed. In addition, declining rig utilization and supply costs will lower operation costs and provide incentives for rigs to stay in operation.

Emerging Offshore Opportunities

Over the past few decades, technological changes have accelerated the efficiency and capabilities of offshore exploration. These technological changes have helped increase the number of offshore discoveries, and today offshore production is approximately 27 MMboe/d, or 28 percent of the world's total O&G production. Robust offshore industries have developed in key O&G countries, including, but not limited to, the United States, Brazil, Canada, China, Indonesia, Malaysia, Mexico, and Norway. In addition to these established markets, there are several other countries that are interested in developing their offshore deposits, such as Guyana, Tanzania, Egypt, and Ireland, which could provide opportunities for U.S. O&G exporters to supply their expertise and their equipment.

In May 2015, ExxonMobil confirmed an offshore oil discovery, Liza-1, off of the coast of the South American country of Guyana, which has been estimated to hold 700 million barrels of oil. At current prices, it would make the Liza-1 well worth around $40 billion, a significant find for Guyana, whose gross domestic product is a little more than $3 billion. However, there are two issues that remain: (1) the discovery was made in an area that is claimed by Venezuela; and (2) there is no established O&G industry or infrastructure in Guyana.

ExxonMobil has stated that it will drill a second exploratory well and that it expects O&G production from Liza-1 by 2020.

Since 2010, there have been several natural gas offshore discoveries in southern Tanzania, which could allow Tanzania to become an important exporter of LNG in the coming years. In particular, discoveries by IOC partnerships are estimated at 16-17 Tcf and 22 Tcf of recoverable natural gas resources. However, there are several challenges that Tanzania faces in the development of its LNG industry, including significant fiscal and regulatory uncertainty, potential renegotiation of existing PSAs to increase the government's share, and the absence of a traditional O&G industry. Despite these hurdles, Tanzania has moved ahead with plans to build an onshore LNG plant near Lindi, in association with BG Group, Statoil, ExxonMobil and Ophir Energy. LNG production is expected in the early 2020s.

In 2015, the Italian company ENI confirmed the discovery of the "supergiant" Zohr natural gas field off the coast of Egypt, which could hold up to 30 Tcf of gas. At current prices, the gas could be worth about $100 billion. Egypt's O&G sector has become a more hospitable investment environment under the Sisi administration, which raised the low domestic fuel prices that previously deterred foreign investment in O&G production in Egypt. ENI plans to commence production at the Zohr field by the end of 2017. In addition to ENI, BP is also in the process of developing three offshore natural gas fields and intends to initiate production in 2017, with full-scale production reaching 1.2 Bcf per day.

In February 2016, the Irish government awarded 14 new licensing options that give companies access to offshore blocks for two years. Interest in Ireland's offshore sector has heightened recently, with the most recent offshore licensing round receiving the most applications in its history. While Ireland remains a high risk and high cost country for O&G exploration and production, the significant amount of interest in the 2016 licensing round demonstrates that companies still see the potential for new O&G discoveries. The most recent discovery in offshore Ireland was the Barryroe field in the Celtic Sea discovered by Providence Resources in 2012.The Barryroe oil field could hold more than 1.6 billion barrels, but production is delayed as the company could not find partners to develop the field.

Country Case Studies

The following pages include country case studies that summarize U.S. upstream O&G equipment export opportunities in selected markets. The markets represent a range of countries to illustrate a variety of points– not the top markets overall.

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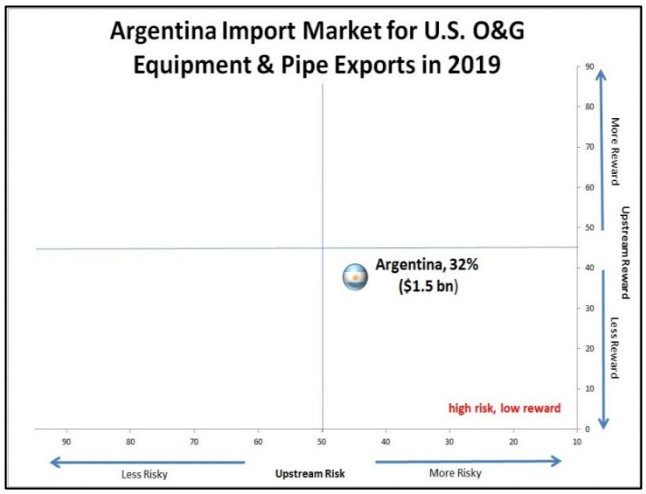
Argentina

Overall Rank: 13

Argentina's O&G sector is poised for strong growth as the result of an improving investment climate and new development in unconventional resources. Much of the investment activity will be in Argentina's shale formations, which are estimated to be the second largest in the world. The newly elected administration will likely continue to improve the investment climate through both macroeconomic and energy sector policy reform. Despite the promise of the sector, lingering concerns of the country's history of credit default and political volatility may inhibit long-term growth.



Background

Argentina ranks 32nd in the world for proven crude oil reserves and 36th for proven natural gas reserves. These estimates, however, do not include the country's unconventional gas reserves, which are estimated to be 30 times that of its conventional gas reserves, and unconventional oil reserves, which are nine times greater than its conventional reserves. Most of Argentina's unconventional resources are found in the Vaca Muerta shale formation, one of the most prolific unconventional formations in the world. The Vaca Muerta could hold up to 16.2 billion barrels of shale oil and 308 Tcf of shale gas.[ii] Roughly the size of Belgium, the formation is estimated to need between $140 and $200 billion of total investment to reach its full level of production.[iii]

In 2015, Argentina had 2.4 billion barrels of proven oil reserves and 11.7 Tcf of proven gas reserves.[iv] Chevron was an early mover into the sector with over $2.75 billion invested in the Vaca Muerta shale formation and currently produces approximately 20,000 bbl/d. ExxonMobil and Shell are in the early stages of exploration in the region following changes to export restrictions and taxation in the sector, and ExxonMobil has recently announced further investment in the development of Vaca Muerta. While most investment is in onshore shale reserves, the country is also working to develop offshore operations. The country's NOC, ENARSA, was formed in 2004 and remains limited in its scope, but it does manage the majority of offshore reserves. These reserves have garnered interest from some IOCs, including Total.

Though crude production will rise in the near-term, increased domestic demand will require import of refined products. After nearly three decades as a net exporter of energy, Argentina began relying on foreign markets to meet its energy needs, importing 87,000 bbl/d of oil products in 2014. Bolivia provided 184 Bcf of natural gas imports via pipeline. An additional 244 Bcf was imported via the nation's two LNG terminals, most of which came from Trinidad and Tobago. Production increases over the next several years should allow net crude exports of 125,600 bbl/d, however, a lack of downstream capacity coupled with increased demand are projected to necessitate 168,200 bbl/d of imported refined petroleum products by 2019.[v]

Market Analysis

In 2014 the United States provided Argentina with 42.5 percent of its total O&G equipment imports, making it the number one exporter to the country. Of the $345 million worth of O&G equipment the United States exported to Argentina in 2015, 41.9 percent were boring or sinking machinery and an additional 16.6 percent of the market was in positive displacement pumps.

Policy Context: Opportunities and Challenges

Argentina strongly supports increased O&G production through subsidies, but this policy is unsustainable. Restrictions on Argentina's ability to access international financial markets will likely be removed within the year, opening the way for greater commercial engagement. It will take time, however, for the new government to demonstrate that Argentina is once again a safe destination for foreign investors.

The oil production subsidy maintained by the government has encouraged greater domestic crude oil production, but the current price environment will make it difficult to sustain. In January 2016, the government set the per barrel price of domestically produced crude oil to $67.50 for Medanito crude (the blend most common in the country). Despite public outcry from domestic consumers who bear the added costs, the national government maintains high natural gas prices to support greater production and investment in the sector. Natural gas prices in Argentina are two to three times those of the North American markets (though comparable to prices in other South American countries). As investment increases and production rises, however, the argument for subsidization of the sector may weaken. Given the push toward market friendly policies, the price floor may be removed, though the recent moderate decrease in prices and desire for stability suggest this will occur over time.

The Argentine government has recently actively supported private-sector-friendly policies to improve relations and increase JVs in the O&G sector. Though not required, the majority of oil ventures in Argentina take place in JVs between IOCs and government entities. Provinces are the legal owners of natural resources and act as regulators and licensors on concessions, but recently, efforts have been made to standardize licensing and regulatory criteria through Ente Nacional Regulador Del Gas (ENARGAS), the federal regulatory body. The historical role of provinces has caused many of them to establish provincial oil companies (POCs), which often partner with IOCs in JV operations. Yacimientos Petrolíferos Fiscales (YPF), the 51 percent federal-government-owned entity, works with many IOCs in upstream production and also controls over 50 percent of the nation's 630,000 bbl/d refining capacity.

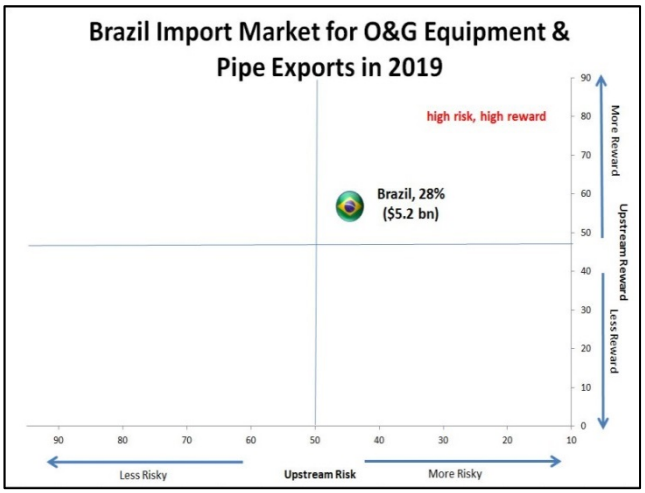
Government policies under the new president, Mauricio Macri, aim to aggressively increase domestic production and promote energy independence. In December 2015, the country lifted its long time capital controls, leading to an immediate devaluation of its currency by roughly 30 percent. As a result, production costs on local goods and labor have been reduced. This policy change also allowed repatriation of profits held by companies in the O&G sector. The administration is making efforts to repair relations with creditors, the results of which are beginning to come to fruition.

Macroeconomic and energy sector specific policy changes have been rapid in the first months of the Macri administration. While these policies have resulted in a fundamental shift in prospects for the industry, their staying power still remains in question. Though Macri's sweeping reforms are positive signs for the O&G sector, the pace at which he accomplished them is an indication of how quickly presidential power can alter the country's economic and energy policy. In a country that has traditionally been prone to large policy swings, this flexibility may dissuade long-term investments.

Brazil

Overall Rank: 7

Despite the low price of oil and other economic constraints, U.S. firms remain competitive in Brazil's O&G sector. The low international price of oil coupled with the Petrobras corruption scandal will drive significant reforms to Brazil's offshore sector and likely spur change in other policy areas, but the extent and breadth of the changes to the well-established O&G sector are still unclear. The situation in Brazil provides needed incentives to open up the country's O&G sector to greater private sector participation and more favorable and stable fiscal terms for exploration and production, as well as changes to trade barriers, such as local content requirements. Successful resolution to the corruption issues will require that Petrobras revisit some of its equipment and service contracts, which may provide new opportunities for U.S. suppliers.



Background

In 2014, Brazil was the world's ninth largest oil producer and South America's second largest oil producer. In 2015, Brazil produced 2.44 mbpd in 2014, 92 percent of which came from very deep, offshore resources. The development of deepwater and, especially, 'pre-salt' resources have driven dramatic increases in Brazil's production, with pre-salt production now making up about a quarter of overall production and increasing to 52 percent by 2018.[vi] Due to the decrease in global oil prices and the Petrobras corruption scandal, production targets for Brazil have declined from 4.0 mbpd to 3.7 mbpd by 2020.

Market Analysis

Brazil was the sixth largest destination of U.S. O&G equipment exports, totaling $739 million, or roughly 3 percent of exports, in 2015. Although these exports have declined from a peak of over $1.5 billion in 2011, we anticipate U.S. exports will reach similar levels again by 2019, when Brazil will represent about 5 percent of U.S. exports of O&G equipment. In 2015, approximately half of U.S. exports to Brazil were parts for sinking and boring equipment and machinery/mechanical appliances.

Of Brazil's approximately $3.5 billion in O&G field equipment imports in 2014, China was the largest source at 21 percent, followed by the United States, Germany and Japan at 20, 12 and 9 percent market share, respectively. Brazil's major imports included parts for derricks, lifting and handling machinery and offshore vessels, comprising 38 percent of its overall imports.

Policy Context: Challenges and Opportunities

Despite the current economic outlook and low price of oil, long-term growth in the O&G sector remains strong because of proved below ground resources, a developed and sophisticated O&G sector and a diversified economy. The start of 2016 is defined by contractions in Brazil's O&G sector as the government looks to restore confidence and prioritize greater efficiency and profitability ahead of politics. The current low price of oil has put pressure on government agencies to reduce or eliminate LCRs and improve the fiscal terms for new bid rounds. At the same time, the corruption scandal that is

gripping Petrobras and the federal government has also shaken investor confidence, forcing senior management to decrease investments for 2016 in an effort to restore financial stability. Combined with increasing inflation, a depreciating currency and a weak macroeconomic outlook, 2016 is expected to be a difficult year for the Brazilian O&G sector.

Since January 2016, Petrobras has begun to shore up its finances by decreasing investments, selling assets and shutting in wells. Corruption charges regarding foreign companies and alleged bribes to Petrobras, coupled with the low price of oil, have placed pressure on Petrobras to pursue a more conservative course toward new investments.

Despite the company's financial woes, ongoing corruption investigations and a 40 percent decreased 5-year investment plan, Petrobras will remain one of the largest investors in the world and is expected to invest $19 to $20 billion in 2016. The low price of oil had prompted Petrobras to shut-in some 22 of its more capital intensive wells and announce its intention to sell $15.1 billion worth of its assets. At the time of this writing, Petrobras is expected to announce reductions totaling $16 billion per year as part of its investment plan for 2016 to 2020. Petrobras is also in the process of reviewing its critical goods and services demand for the next five years. U.S. companies can look forward to opportunities of exporting services to support Petrobras shut-ins, as well as purchasing assets that the company is looking to sell. Recent press announcements noted Petrobras' plans to sell gas pipelines, gas-fired power plants and some LNG terminals, which could increase planned divestments to about $50 billion.

The financial terms included in the latest bid round for O&G project blocks reduced investor interest in the Brazilian O&G sector, but it is unclear what the government will do to increase private sector interest. In October 2015, the government held its 13th licensing round for 266 blocks, most of which were onshore but also included offshore blocks and three blocks in the 'pre-salt' Campos Basin. The round did not meet expectations as only 37 of the blocks were awarded, most of which were in already developed formations, and included no deepwater blocks. Further, no major IOCs submitted bids, a sign that the price of oil was too low to justify the financial terms offered. While the Brazilian regulator, Agencia Nacional do Petroleo, Gas Natural e Biocombustiveis (ANP), did slightly alter the exploratory requirements of the licensing terms, the financial commitments remained unchanged. Considering the lack of interest in the 13th bid round, ANP will need to critically review why there were so few bids and how the next bid round could be altered to attract private sector interest.

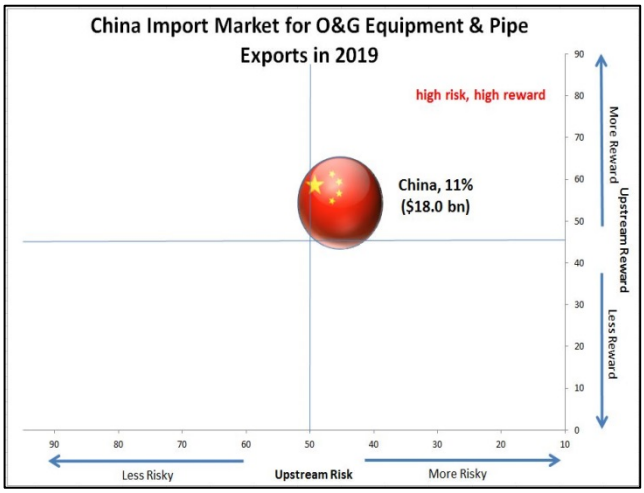
Recent amendments to the existing LCR policy will improve opportunities for U.S. equipment manufacturers and service suppliers. In January 2016, Brazil introduced a new program that offers concessionaires credits that can be applied toward satisfying LCRs in exchange for stimulating the Brazilian O&G supply chain through investment and other activities.[vii] This change will make it easier for O&G companies operating in Brazil to meet high LCRs. In addition, ANP has proposed a resolution that seeks to mitigate distortions caused by price changes that occur throughout the life of a project that can affect the ability of concessionaires to satisfy LCRs.[viii] Changes to Brazil's LCR policy will also support greater profitability of Petrobras, as it would also have greater access to lower-cost equipment and services. Currently, exploration phase activities require that between 37 and 85 percent of goods and services are local and that development phase activities must use between 55 and 80 percent Brazilian content.[ix]

U.S. exporters will find commercial opportunities to supply drilling rigs, flow measurement equipment, mobile well test plants, pig valves, pig launchers, chokes, electrical panels, completion tools and well abandonment expertise.

China

Overall Rank: 14

China's O&G sector is well developed but has plateaued and only serves the domestic market. Low international O&G prices are inducing moderate production growth from Chinese SOEs Sinopec and China National Offshore Oil Corporation (CNOOC). While near-term market conditions have decreased demand for new upstream developments, China still maintains robust growth in energy demand. As the government seeks to increase the use of natural gas in its energy mix, more commercial opportunities for large-scale shale gas development are likely. Regulatory uncertainty and restrictive policies, however, remain a barrier for foreign participation.



Background

China is the largest energy consumer and producer in the world, and energy issues are among Chinese policymakers' top concerns. As China pushes to meet its energy demand, the environmental costs of energy consumption—such as pollution from coal-power generation and transportation—have also accelerated China's search for new and cleaner forms of energy, particularly natural gas. Decreases in energy demand growth have helped to decrease energy prices in China, but robust automobile sales and increased demand for air travel represent new areas for energy demand.

Market Analysis

In 2015, the United States exported $1.5 billion of O&G equipment to China (the third largest trading partner overall), representing about 6 percent of U.S. O&G equipment exports. The top U.S. O&G equipment exports to China were parts for sinking and boring machinery, positive displacement pumps and machinery/mechanical appliances.

In 2014, China imported $15.3 billion in O&G equipment, making it the second largest destination of imported equipment in the world after the United States. Over half of China's O&G equipment imports came from four main trading partners: Japan, Germany, South Korea and the United States, and the United States was the source for 12 percent of Chinese imports of O&G equipment. Most of the equipment imported by China from all countries were categorized as downhole wireline tools or machinery for lifting, loading and unloading.

Policy Context: Challenges and Opportunities

Low oil prices will have a significant impact on new upstream O&G developments in China has forced CNOOC and Sinopec to decrease capital expenditures and reduce production from high cost wells. In addition, China's economic growth is slowing, and the country is not the source of new energy demand that it once was. Despite these challenges, China is still the fourth largest oil producer in the world with demand increases for transportation fuels and energy generation from natural gas. Regardless of the economic environment, China is a challenging market with difficult regulations, barriers to investment and a discriminatory business environment.

The low price of oil will hinder further development of China's O&G sector and challenge Chinese operators to reconcile the fact that production costs for many wells in China are above international spot prices. Given current crude oil prices, Sinopec and CNOOC have been unable to compete within such a

low price environment and were forced to reduce production from its high-cost fields, mostly within China. In 2015, Sinopec reduced its capital expenditures by 45 percent, and CNOOC recently announced a 10 percent decrease in its capital expenditures for 2016. Despite these challenges, low global crude oil prices have had one positive effect on China's economy, as they have allowed the Chinese government to fill its strategic petroleum reserve with inexpensive foreign crude oil while maintaining a $40 per barrel price floor for domestic sale.

The Chinese government is looking for ways to increase demand for natural gas as a cleaner source of energy production. The government recently reduced the price for non-residential users to $8/mm Btu to better reflect market conditions. While the price reduction will induce producers to decrease domestic production of natural gas, it should contribute to increased long-term demand.

The Chinese Ministry of Land Resources estimates China's technically recoverable shale gas resources to be 885 Tcf. China faces a number of challenges in raising production: difficult geology and topography, lack of water and infrastructure, lack of technology and skilled personnel, and yet-to-be-determined or nascent policies and regulations. In 2012, to encourage the exploration of shale gas, the Chinese government established a four-year, $1.80 per mm Btu subsidy program for any Chinese company reaching commercial production of shale gas. In mid-2015, the subsidy program was extended to 2020, but at a lower rate.[x]

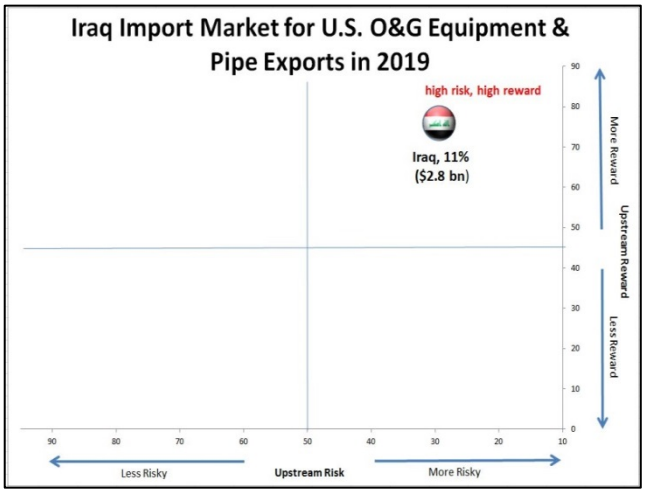
Foreign participation in China's shale initiative is limited, and lack of competition and uncertain regulations continue to frustrate international companies' efforts. Nonetheless, ample subsidies, legal reform and productivity targets are among the reasons companies are still investing in China's shale gas sector. U.S. companies that specialize in drilling, extraction equipment, and pipeline construction or provide operational services for shale gas developers may benefit from the growth of the Chinese shale gas market. In addition, companies with expertise in seismic analysis and water efficiency technologies will also be well-positioned as the market continues to develop.

IOCs and service companies have established their presence in China chiefly through partnerships with Chinese companies. For offshore development, IOCs mostly partner with the state-owned CNOOC, and for both onshore and offshore projects (which often involve complicated drillings), service companies are hired by China's three largest state-owned firms. Offshore participation, however, carries additional risks because of China's expansive territorial claims. While some of China's offshore activity falls within recognized boundaries, there are ongoing maritime disputes with Indonesia, Japan, Malaysia, the Philippines and Vietnam.

Iraq

Overall Rank: 19

The Government of the Republic of Iraq (Iraq) is attempting to dramatically increase its production levels of crude oil by 2020, requiring large investments in infrastructure and O&G equipment. These efforts, however, will be tempered by lower global crude prices, which have already forced Baghdad to decrease development spending. Violence and continued conflict with transnational terrorist groups in the western and northern portions of the country will have a limited impact on production, as production remains concentrated in southern Iraq and Iraqi Kurdistan.



Background

Iraq possesses the world's fifth largest proved reserves of crude oil and is OPEC's second largest crude oil producer. Furthermore, Iraq holds the world's 12th largest proved reserves of natural gas. All of Iraq's known hydrocarbon reserves are onshore, and all of its known major fields are in production or in development. Iraq's O&G sector is recovering from years of international sanctions and conflict, but oil production ramped up by nearly 1 mbpd between 2010 and 2014 despite a series of setbacks, including infrastructure constraints, slow contract agreements, political disagreements and sustained violence that caused supply disruptions. The Iraqi government continues to seek higher oil production levels, setting ambitious targets of more than 9 mbpd by 2020 (with a more likely output totaling 6 mbpd by 2020). The country's oil reserves are not evenly dispersed across ethno-religious communities with oil concentrated in the semiautonomous northeast that is administrated by the Kurdistan Regional Government (KRG) and the Shia-dominated south. However, in an attempt to support OPEC's efforts to alleviate the global oversupply of crude oil and increase global oil prices, the Government of Iraq recently issued verbal approval to curb higher production levels, keeping oil production at around 3.2 mbpd.

Iraq holds around 113 Tcf of natural gas reserves, accounting for slightly less than 2 percent of the world's proved reserves. Lack of pipeline infrastructure prevents greater use of the resource, and currently more than half of the natural gas Iraq procures is vented and flared, making it one of the largest natural gas-flaring countries in the world. The Iraqi government has attempted to reduce its gas-flaring by entering into joint venture agreements to export LNG or natural gas export pipelines. The Iraqi government has discussed plans for restoring a pre-Gulf War natural gas pipeline with Kuwait, as well as the construction of a pipeline with Iran and Syria toward Europe. In March 2016, Iraq exported its first shipment of natural gas in its history, shipping 10,000 standard cubic feet of gas condensate from the Gulf of Basrah. Additional shipments of natural gas condensate are expected.

IOCs that are present in Iraq operate under technical service contracts (TSCs), in which they are paid a fixed fee for production, as negotiated by the Ministry of Oil. IOCs are concentrated around Iraq's southern oilfields, including BP, Royal Dutch Shell, ExxonMobil, Eni and Lukoil. Unlike in other parts of Iraq, IOCs operating in Iraqi Kurdistan enter PSAs. The Iraqi government in Baghdad and the KRG have repeatedly clashed on the O&G sector, most notably around the development of resources in disputed border areas and contracts with IOCs.

Market Analysis

In 2015, the United States exported $130 million in O&G equipment to Iraq (down from $194 million in 2014), representing less than 1 percent of total U.S. O&G equipment exports. The main products exported include parts for boring and sinking machinery and gas filter/purifying machines. In 2013 and 2014, Iraq relied on several sources for its O&G equipment imports, including China (23 percent of 2014 imports), Italy (14 percent), the United States (13 percent), Germany (9 percent) and Japan (6 percent). Iraq remains a marginal player in the exporting of O&G equipment, exporting $1.9 million in 2013 and $0.9 million in 2014.

Policy Context: Opportunities and Challenges

In its attempts to ramp up production, Iraq faces several issues that impact further development of the O&G sector, including infrastructure constraints, limited resources, political instability, declining global oil prices and security concerns.

Insufficient transportation infrastructure and limited resources for O&G projects hinder Iraq's ability to meet production goals. Iraq does not possess enough midstream infrastructure to accommodate its ambitious production goals or lessen production disruptions, and will require additional electricity to meet the demand associated with higher production levels. In addition, increasing production from aging fields will require a large amount of gas flooding or water flooding for aging wells, which is a highly debated technique among Iraqi oil engineers.

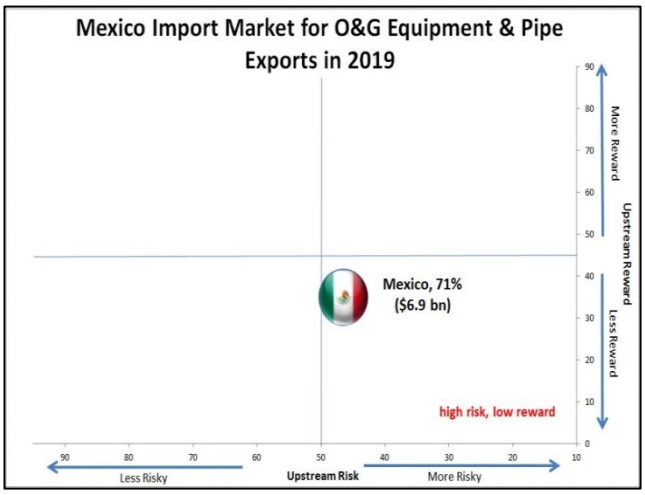
Furthermore, Iraq's parliament has failed to pass a hydrocarbon law that had been under consideration since 2007, underscoring the country's political difficulties due to ethnic and sectarian political factions. These disputes are likely to increase in the face of declining international oil prices, which has already forced Iraq to reduce the funds available to the Ministry of Oil. Furthermore, Iraq remains a challenging place to do business due to widespread corruption, a slow bureaucracy and country-wide security challenges.

Once seized territory has been liberated from ISIL, the Iraqi Government will need to repair facilities damaged in the fighting, including the Beiji refinery and the Iraq-Turkey pipeline. In the summer of 2014, ISIL attacked northern Iraq, seizing the city of Mosul and other towns. This allowed ISIL the capacity to control northern Iraq's oil production and refining (excluding Iraqi Kurdistan), but this did not disturb southern Iraq, where 95 percent of Iraq's total crude exports came from in 2014. Several of these smaller fields and refineries have been damaged by international airstrikes or have been retaken by Iraqi or Kurdish forces. In addition, ISIL has taken oil from storage facilities, pipelines and pumping stations across the territory and continues to sell oil on the black market. A multi-pronged international response, however, has targeted the group's oil infrastructure in order to cripple its oil smuggling.

Mexico

Overall Rank: 4

Low oil prices hinder the pace of development in Mexico's O&G sector, but the historic opportunity for foreign and private companies to enter the market is likely to make Mexico's O&G sector highly competitive. In 2013, Mexico adopted large-scale reforms that offer new opportunities for U.S. companies. Apart from growth in trade, greater competition is anticipated in the O&G subsector, directly resulting from the end of Mexican Petroleum's (PEMEX) monopoly. To take advantage of new commercial opportunities, U.S. O&G equipment exporters should look beyond state-owned oil company PEMEX and consider partnerships with newly-emerging Mexican O&G companies. Given the advanced technical capabilities of many U.S. companies, there are significant opportunities for developing Mexico's deepwater and unconventional oil resources, which are largely undeveloped.



Background

Mexico is one of the world's top 10 oil producers and has the third largest proven oil reserves in Latin America, after Venezuela and Brazil, with 9.8 billion barrels. In 2014, Mexico produced 2.8 mbpd of crude oil, its lowest rate since 1986, amid production declines of almost 30 percent over the past decade.[xi] Slowing oil production rates are likely to continue, and it is projected that Mexico's oil production will decline to 2.4 mbpd by 2019. In 2014, Mexico produced 45 Bcm of natural gas and holds an estimated 15.4 Tcm of technically recoverable shale gas resources. Despite its large shale gas resources and rising demand for natural gas for power production, Mexico's reliance on inexpensive natural gas imports from the United States may discourage development of its own shale gas resources.

Market Analysis

Mexico represents a large global import market for O&G field equipment as one of the 10 largest equipment importers globally. In 2015, Mexico was the second largest destination for U.S. exports of O&G equipment, totaling $3.4 billion and representing 15 percent of global U.S. exports. Over the past decade, U.S. exports of O&G equipment to Mexico have grown over 200 percent from $1.1 billion in 2004 to $3.4 billion in 2015 and are expected to grow steadily through 2019.

In 2014, the United States was by far the largest source for Mexican imports of O&G field equipment, holding a 56 percent market share. After the United States, Mexico's largest sources for O&G equipment were Japan, Germany and China with 8, 7 and 5 percent market shares, respectively. Mexico's largest imports were machinery/mechanical appliances with individual functions (30 percent of imports) and filtering/purifying machines for gases (19 percent of imports). In 2015, the largest U.S. exports to Mexico were filtering/purifying machines for gases, parts for boring or sinking machinery and machinery/mechanical appliances with individual functions, which represented more than 60 percent of total U.S. exports of O&G equipment to Mexico.

Policy Context: Challenges and Opportunities

U.S. companies are likely to achieve greater commercial engagement in Mexico's energy sector as a result of their technical expertise, liberalization efforts within Mexico's O&G sector, the troubled state of PEMEX and the emergence of private Mexican exploration and production companies. Recent energy reforms ended PEMEX's 76-year monopoly over the O&G sector and instituted flexible terms for foreign companies operating in Mexico. Subsequent reforms have encouraged the development of Mexico's deepwater and unconventional resources, providing significant opportunities for U.S. companies given their advanced technical capacities. Financial issues facing PEMEX compound the need for increased U.S. investment in Mexico, while newly-emerging private O&G companies in Mexico could hold potential as future business partners and customers.

In 2013 and 2014, the Government of Mexico adopted two waves of wide-sweeping energy reform legislation to open its O&G sector to private investment. The reforms allowed foreign companies to enter into profit sharing, production sharing and service contracts with PEMEX, as well as receive licenses for O&G exploration and production. The reforms also outlined regulatory and fiscal terms and launched a bidding process to award all O&G exploration and production contracts and licenses.

Mexico's regulatory and fiscal terms for O&G upstream projects are reasonable, especially compared to others in the region. However, LCRs do exist and are currently set at 25 percent for new projects with an increase to 35 percent by 2025. There are some exemptions for deepwater projects, but this policy is still under development by the Mexican government. In addition, PEMEX is required to have a 20-percent stake in all cross-border fields, including deepwater and onshore shale projects.[xii]

Additional efforts by the Government of Mexico to provide production incentives are likely to stimulate greater investor interest in future bidding rounds. The Ministry of Energy (SENER) recently increased the acreage available for O&G exploration by 32 percent (with total acreage reaching 235,000 sq. km) and improved availability and access to high quality seismic data during bidding rounds. These and other reforms were included in SENER's updated five-year plan for the exploration and production of hydrocarbon resources, which was developed in response to low investor interest during Phase One of Mexico's Round One bidding for O&G exploration and production contracts in July 2015. Phases Two and Three saw significant investor interest and demonstrated the Government of Mexico's willingness to address industry concerns. Deepwater leases were announced as part of the Phase Four auctions in December 2015 and the bidding round scheduled for December 2016 has attracted major U.S. companies and IOCs. PEMEX has also announced farm-out opportunities in the Trion field. The contract schemes for the offshore bid round and farm-out agreements are still being discussed.

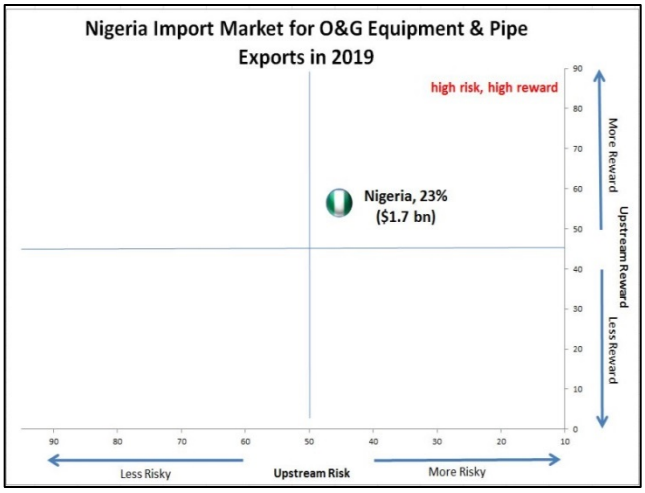
Mexican O&G companies with sufficient financial resources could provide substantial value-add to U.S. companies operating in Mexico. The energy reforms encouraged the emergence of private, local companies within Mexico's O&G sector. Although most local exploration and production companies do not have the capacity to independently operate O&G projects, they can contribute extensive knowledge on local laws, taxes, security and labor issues.

Although low crude oil prices pose financial risks for U.S. companies considering capital intensive deepwater or unconventional projects, these risks are mitigated by Mexico's need for increased investment in the O&G sector. Impacted by low crude oil prices, PEMEX has suffered huge losses and is expecting substantial cuts in capital expenditures for 2016. In February, President Nieto replaced the CEO of PEMEX – another indication of the company's troubled state. U.S. companies are positioned to meet Mexico's need for increased investment in sector technology and services, specifically the advanced technical capacities of U.S. companies in deepwater and unconventional exploration and production. Risks facing U.S. companies developing deepwater blocks in the Gulf of Mexico are also reduced due to the 2013 U.S.-Mexico Transboundary Hydrocarbon Agreement, as exploration on the U.S. side has led to significant oil discoveries.

Nigeria

Overall Rank: 25

Nigeria's large hydrocarbon resources hold significant potential for U.S. exports, but existing above-ground risks have caused uncertainty for greater development of Nigeria's O&G sector. Regulatory issues, security concerns and corruption have contributed to declining investment in O&G projects in recent years and have challenged the Nigerian government to balance its revenue and its investment needs. It is expected that the government will consider more flexible regulatory reforms to stimulate increased investment and to support greater development of the O&G sector. President Buhari has also undertaken reforms to improve security and combat corruption within Nigeria's O&G sector, which should also contribute to a more predictable business environment. The impact on Nigeria's O&G equipment market from Buhari's reforms, however, may be muted due to the low price of oil and the prospect for a depressed market in 2016.



Background

Nigeria is the largest oil producer in Africa and has an estimated 28 billion barrels of proven crude oil reserves. Despite declining production in recent years, the Nigerian government aims to increase oil production in the coming years. Nigeria has the largest natural gas reserves in Africa and was the fourth largest world exporter of LNG in 2014. To meet rising domestic consumption and maintain current levels of LNG exports, the country's natural gas production is expected to rise by almost 25 percent to 46.7 Bcm per year in 2019.

The majority of O&G projects in Nigeria are funded through JVs between IOCs and the Nigerian National Petroleum Corporation (NNPC), with NNPC as the majority shareholder. Deepwater projects are usually managed through production-sharing contracts with IOCs and have more attractive fiscal terms to incentivize investment. The Nigerian government is currently in the process of restructuring NNPC and unbundling the vertically integrated company.

Market Analysis

Nigeria represents a small-sized global import market for O&G field equipment. In 2015, Nigeria was the 24th largest destination for U.S. exports of O&G equipment, with $234 million in exports (less than 1 percent of global U.S. exports). U.S. exports of O&G equipment to Nigeria peaked in 2007 at over $500 million and declined in recent years due to an unfavorable investment environment and the introduction of strict LCRs in 2010. While we expect that U.S. market share in Nigeria will increase by 2019, we do not anticipate that U.S. exports of O&G equipment will reach levels similar to those of 2007 in the forecast period.

In 2014, the United States was the second largest source for Nigerian imports of O&G equipment, holding a 17 percent market share. South Korea was

the largest source for Nigerian imports of O&G equipment, with a 32 percent market share and $536.8 million in exports. Nigeria's largest imports were floating or submersible drilling or production platforms (34 percent of imports) and non-stainless steel line pipe (13 percent). In 2015, the largest U.S. exports to Nigeria were floating production platforms, machinery/mechanical appliances and parts for boring or sinking machinery, which represented more than 60 percent of total U.S. exports of O&G equipment to Nigeria.

Policy Context: Challenges and Opportunities

ITA anticipates that the investment environment for Nigeria's O&G industry will become more hospitable as new regulatory framework is considered and as progress is made through President Buhari's anti-corruption and security initiatives. Aboveground impediments such as regulatory issues, security concerns and corruption continue to slow new O&G project development in Nigeria. Regulatory issues including strict LCRs and the Petroleum Industry Bill (PIB) pose fiscal and operational challenges to U.S. companies working in Nigeria. In addition, security concerns, such as oil theft and pipeline attacks, and pervasive corruption within the O&G sector will continue to discourage international investment in Nigeria's O&G industry. Furthermore, restricted access to the U.S. dollar for foreign exchange is also a challenge to international investment in Nigeria's O&G industry.

Strict LCRs limit the amount of U.S. O&G equipment exports to Nigeria. Companies undertaking O&G projects are subject to LCRs for goods, services and labor ranging from 45 to 100 percent. In addition, requirements to hire Nigerian workers and deposit 10 percent of annual profits into a Nigerian bank pose operational challenges to U.S. companies working in Nigeria. Additional regulatory constraints are outlined in the country's Oil and Gas Content Development Act of 2010, which is intended to increase Nigerian participation in the O&G industry and retain greater economic benefits from oil production.

New legislation to replace the fiscal and regulatory reforms outlined in PIB has yet to be drafted but will likely include more favorable conditions for investors in an effort to increase government revenues and minimize the effects of declining crude oil prices on the economy. The Nigerian government has proposed fiscal and regulatory reforms through PIB, including a strict fiscal regime with increased royalties, higher taxes and potential renegotiation of contract terms with IOCs. The prolonged consideration of PIB, however, has created regulatory uncertainty and discouraged new investment. To address these concerns, the government recently split PIB into two draft laws in the hopes that separate pieces of legislation will be more easily passed through the National Assembly and support greater regulatory stability in the sector. The current terms under consideration would likely make large-scale upstream oil projects in Nigeria (particularly capital intensive deepwater projects) economically unattractive for U.S. upstream O&G companies.

In addition to regulatory challenges, U.S. companies operating in Nigeria face security concerns and corruption. The presence of Boko Haram and new groups threaten O&G projects in the northeast of the country, but does not impact projects in the south, where the majority of Nigeria's O&G deposits are located. Onshore projects in Nigeria, however, are vulnerable to oil theft and pipeline attacks, and offshore projects may be targeted by piracy. In recent years, security concerns have led IOCs to leave projects in Nigeria. In addition, corruption remains widespread in the O&G sector, and President Buhari has admitted publicly that as much as 250,000 barrels of Nigerian crude oil are stolen daily.

ITA anticipates that Nigeria's fulfillment of the Extractive Industries Transparency Initiative (EITI) membership conditions as well as President Buhari's continued efforts to fight corruption and improve security will create more favorable conditions for U.S. companies operating in Nigeria. Since his election in April, President Buhari has taken steps to reduce pipeline attacks by reorganizing existing military task forces to secure O&G pipelines. He has also launched anti-corruption initiatives (independent of EITI) to regain investor trust in Nigeria's O&G industry, replacing the entire board of NNPC in July and banning 113 vessels suspected of illicit activities from lifting crude oil from Nigerian ports. In addition to efforts initiated by President Buhari, Nigeria has been compliant with EITI since 2011. As a result of Nigeria's participation in the initiative, Nigeria passed EITI-dedicated legislation, exposed outstanding NNPC debts to the federal government, published estimates of the volume of

oil theft and identified weaknesses in regulatory bodies. U.S. O&G equipment suppliers may be affected by foreign exchange restrictions in Nigeria, which have led to challenges in securing the U.S. dollar for international transactions. Low oil prices and a high level of imports for consumption have significantly affected the Nigerian economy. To avoid devaluing the currency, the central bank adopted strict foreign exchange restrictions. While trade itself is not banned, the restrictions have banned dollar access for the purchase of 41 items, including steel pipes and drums.

Similar to oil projects, we anticipate that the investment environment for natural gas projects will improve as regulatory issues, security concerns and corruption are addressed by the Buhari administration. Due to rising domestic demand, Nigeria will need to increase natural gas production to maintain current levels of LNG exports, and it is expected that rising demand for electricity will be met through increased use of gas-fired power plants.

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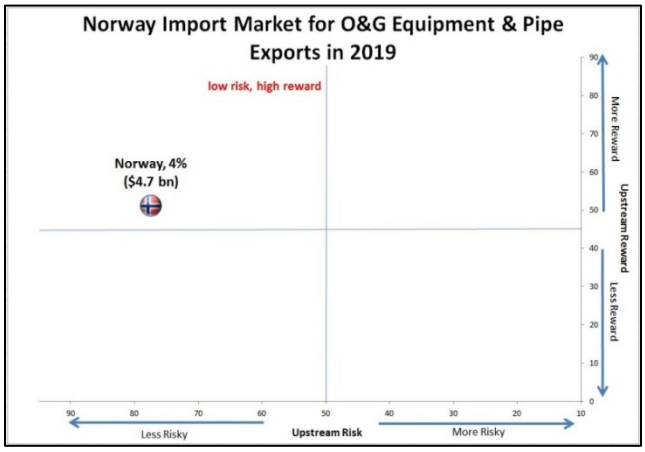
Norway

Overall Rank: 8

Despite the low price of oil and overall declining production, Norway remains a predictable environment that is unlikely to be overly impacted by the current downturn. While Norway is projected to maintain relatively stable production in 2016, the low price of oil is likely to contribute to closures of small and underperforming fields. Bids for Norwegian contracts are competitive, and significant commercial opportunities exist for U.S. companies specializing in offshore well abandonment, shut-ins, harsh-environment oil rigs, natural gas transportation, and monitoring and processing. Operation costs in Norway are high, and low-cost high-quality producers can be competitive once established in the market.



Background

In 2014, Norway was the world's 15th largest oil producer and fifth largest natural gas producer. It is Europe's largest crude oil producer and the world's third largest exporter of natural gas. Norway produced 1.9 mbpd and 3.8 Tcf of natural gas, all from offshore Norwegian continental shelf. Norway's crude oil production peaked in 2001 at 3.4 mbpd, but has declined since with a slight uptick in 2014. Natural gas production, however, has increased each year since 1993. Because of a significant project pipeline, Norway is adding production from new fields such as the giant Johan Sverdrup. In 2014, Norway exported 95 percent of its natural gas production, mostly to France, Germany, Spain and the United Kingdom.

Market Analysis

Norway has remained a relatively small market for U.S. O&G equipment exports despite significant activity in its offshore sector and the competiveness of U.S. companies. In 2015, Norway ranked as number 18 of countries importing U.S. upstream O&G equipment. Last year, Norway imported $321 million in U.S. O&G equipment, or about 1.4 percent of all U.S. O&G equipment exports. Major products exported from the United States included floating production platforms (53 percent), machinery/mechanical appliances (17 percent) and parts for boring or sinking machinery (15 percent).

In 2014, Norway was the world's 14th largest destination of upstream O&G imports, procuring $3.6 billion of upstream O&G equipment. The largest source of O&G equipment imports came from South Korea, at $800 million or 22 percent, followed by the United Kingdom, Japan and Germany, with 14, 13 and 10 percent, respectively. Of Norway's approximately $3.6 billion in O&G equipment imports in 2014, the most imported equipment were floating production platforms followed by parts for boring and sinking machinery, drilling tube and pipe and parts for derricks.

Policy Context: Opportunities and Challenges

Norway's O&G sector is a favorable market for U.S. investment as the Norwegian government has maintained a stable policy environment with transparent framework conditions for companies to explore for and develop new resources. The straightforward tax regime, availability of new acreage in mature and frontier areas, stable fiscal and monetary climate and large amounts of capital

spending contribute to the sector's stability. Norway's O&G tax policies are significant drivers for the offshore energy sector, as the government refunds 78 percent of exploration costs to companies and reduces taxes on exported LNG.

Despite its favorable policy environment, the Norwegian O&G sector is also defined by its high cost of entry, both in terms of conducting business and the high capital costs of operation. The low price of oil has made some O&G projects economically infeasible, as high cost, low production wells have become easy targets for shut-ins. The Norwegian government requires a 2-year warning before a well can be shut-in, and ITA anticipates heavier decline rates and closure at smaller fields in Norway. Despite this, Norway has a significant project pipeline that will be able to maintain current production levels, offsetting anticipated production declines from shut-ins.

Considering the significant amount of development in Norway's offshore O&G sector, new technology is crucial for increasing incremental demand and may provide new commercial opportunities for U.S. exporters. While many Norwegian companies already focus on the development of subsea systems, there is still demand for seismic surveys, interpretation of seismic data, directional drilling, subsea processing, information technology and communication technology. Potential commercial opportunities exist for U.S. technology and service suppliers in these areas, as all of Norway's O&G production is offshore and new fields located in challenging environments requiring zero-surface, subsea and deepwater technology that can withstand ever-challenging environments in remote and isolated locations.

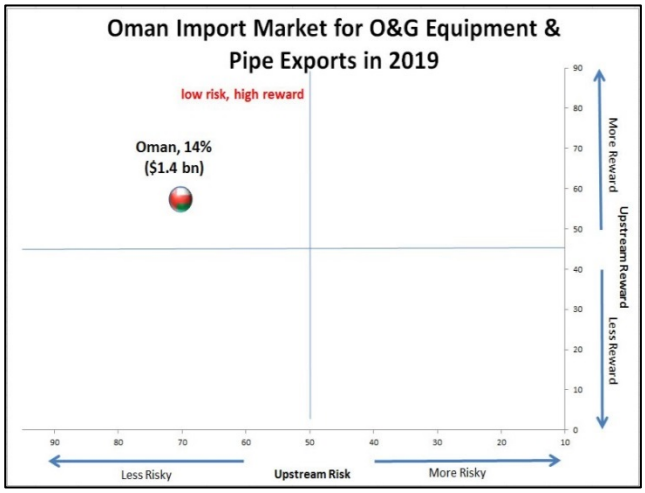
Since natural gas production and export will be an area of continued growth in Norway's O&G sector, U.S. companies in the LNG technology and natural gas value chain that focus on clean production and transportation of gas from remote locations are especially well positioned. IOCs such as ExxonMobil, ConocoPhillips, Total, Shell and ENI have a substantial presence in Norway, in partnership with Statoil. Gassco, the Norwegian state-owned gas company, is the operator of Norway's natural gas pipeline network, including for international pipelines and receiving terminals that export to the United Kingdom and continental Europe. In 2014, Europe received 60 percent of Norway's LNG exports with the majority going to Spain.[xiii] The Americas received 25 percent, and 15 percent went to Asia. Norway's first large scale liquefaction facility at Melkoya opened in 2007 and draws gas from the Snohvit natural gas field.

Norway's efforts to expand O&G exploration and development in the Arctic Circle present opportunities for U.S. manufacturers and service providers in coming years, with the potential for additional opportunities as O&G development in the Barents Sea continues. In May 2016, Norway held a licensing round that awarded 10 production licenses for 40 blocks in the Barents Sea. The licensing round marked the first time in 20 years that Norway had opened new acreage to O&G exploration, signaling the country's commitment to energy development in the Arctic. The Snohvit and Goliat projects are Norway's only O&G producing fields in the Barents Sea, with oil production from Goliat beginning in March 2016. The next field to be developed in the Barents Sea is the Johan Castberg field, located 100 km north of Snohvit, and Statoil has announced its intentions to make a final investment decision on the project in 2017.

Oman

Overall Rank: 22

The Sultanate of Oman (Oman) is a stable market in a volatile region, with a modern infrastructure, an educated population and respect for international standards that are enshrined in the U.S.-Oman FTA. Opportunities in Oman are focused on its reliance on EOR technology to access hard to reach hydrocarbon reserves. Challenges persist, however, including the relative size of the market, instability of nearby countries and market access issues.



Background

Oman holds the world's 22nd largest proved reserves of crude oil and the 30th largest proved reserves of natural gas. While Oman is not a member of OPEC, it is the largest producing non-member in the region and has maintained that it is willing to work with the bloc to stabilize the oil market by cutting production in 2016. Furthermore, Oman is a member of the Cooperation Council for the Arab States of the Gulf (alternatively, the Gulf Cooperation Council), which has sought greater regional integration, including on O&G policies.

Located at the crossroads between the Arabian Sea, the Persian Gulf, the Gulf of Oman and the Strait of Hormuz, Oman's geostrategic position is linked to some of the world's busiest energy corridors. Oman's oil production is centered on the Oman Basin, which crosses the entire country. The Omani government has indicated its intention to maintain its crude oil production levels, utilizing EOR technologies when necessary, including polymer, miscible and steam injection techniques.

The country's gross natural gas production declined to 1.09 Tcf in 2014 (from 1.13 Tcf in 2013) with more than 80 percent of its gross production coming from non-associated natural gas fields. The growth of the Omani natural gas sector has been tied to the construction of the country's two LNG facilities near the city of Sur in the Gulf of Oman. The facilities allowed dry natural gas production to increase from 322 Bcf in 2000 to 1.09 Tcf in 2014. Oman is a member of the Gas Exporting Countries Forum (GECF) and exported 375 Bcf of LNG, almost entirely to South Korea and Japan in 2014. While rising domestic demand is forcing Oman to reduce its exports of natural gas, LNG production may expand if Iran contracts with Oman Liquefied Natural Gas (OLNG) to liquefy Iranian gas for export, rather than selling the gas directly onto the Omani grid.

Oman's O&G sector is managed by the Ministry of Oil and Gas, however, oversight and final authorization on oil policy is reserved for the Sultan of Oman, Qaboos bin Said al Said. The Omani government owns a 60 percent majority stake in Petroleum Development Oman (PDO), an exploration and production company that controls most of the country's reserves and 70 percent of its production. Several IOCs have a stake in PDO, including Shell (34 percent) and Total (4 percent). PDO has an even stronger role in the natural gas sector, accounting for almost all of the country's supply. OLNG, which is jointly owned by internal oil companies and the Omani government, controls all of Oman's LNG activities.

Market Analysis

In 2015, U.S. exports of O&G equipment to Oman totaled $97.9 million. The main products exported included parts for boring or sinking machinery and

machinery/mechanical appliances, representing half of total U.S. O&G exports to Oman. In 2013 and 2014, Oman relied on a few key sources for O&G equipment imports including the United Arab Emirates (31 percent of 2014 imports), China (26 percent), the United States (11 percent) and Saudi Arabia (8 percent). Oman remains a minor player in the exporting of O&G equipment, exporting only $106.6 million in 2013 and $6.3 million in 2014. The primary export markets are countries near to Oman, including the United Arab Emirates, Sudan, Bahrain, Pakistan, Singapore, India and Yemen.

Policy Context: Opportunities and Challenges

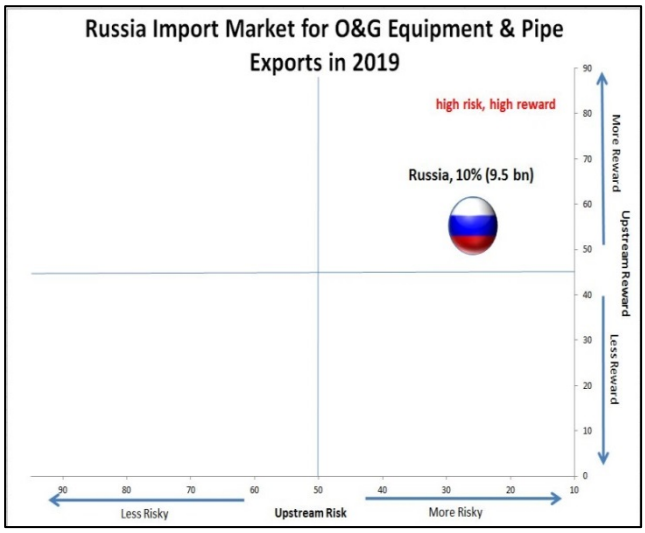
Oman offers an attractive market setting as it provides stable conditions in an unstable region. The country observes rule of law and relatively free markets, has modern infrastructure and has an educated population. However, low oil prices have severely hurt Oman and created a rising budget deficit due to Oman's reliance on hydrocarbon exports to stimulate government revenue. As a result, the government has been forced to implement spending cuts, tax increases and reform its subsidy programs. The Omani parliament voted in December 2015 to place tax hikes specifically on O&G sector companies while the Omani Shura Council voted separately to raise the corporate tax rate. Outside of these larger macroeconomic constraints, there are also several market challenges in the country, including a relatively small population, competition from nearby countries (including the United Arab Emirates and Saudi Arabia), and the attractiveness of other nearby markets that offer higher industrial subsidies and lower national hiring quotas. Other market access challenges also persist, including long clearances for visas and permits, a moratorium on real property rights for foreigners and the lack of delineation between the public and private sectors.

Oman's O&G production is intimately linked to EOR technologies, which has increased the operating cost for IOCs that are involved in exploration and production. This relative difficulty, however, has forced the Omani government to offer incentives to companies, including more generous contract terms, such as greater equity shares than other countries in the region. According to the Ministry of Oil and Gas, Occidental Petroleum has the greatest stake of any foreign firm. Other companies involved in the Sultanate include Shell, Total, Partex, BP, CNPC, KoGas and Repsol. In terms of O&G equipment trade, the United States and Oman entered into a FTA in January 2009 in order to create export opportunities for American products, encourage greater liberalization of Oman's trade and economic policies and solidify intellectual property rights. The FTA allows American companies to register as Omani firms, with no requirement for a local partner.

Russia

Overall Rank: 20

As long as existing economic sanctions remain in place, U.S. companies will have difficulty finding profitable investments in high-cost, long-term projects in Russia. U.S. companies will be impacted by U.S. Government sanctions on deepwater, Arctic offshore and shale projects in Russia. In light of ongoing Russian actions in eastern Ukraine, operating in Russia's O&G sector remains risky, as there are concerns over the weakness and instability of the Russian economy. This has resulted in some western companies abandoning the market with others slowing their operations. U.S. exporters should consult with both the U.S. Treasury Department's Office of Foreign Asset Controls (OFAC) and the U.S. Department of Commerce's Bureau of Industry Security (BIS) for the most current listings and descriptions of applicable sanctions.



Background

Russia holds the world's eighth largest proved reserves of crude oil and the largest proved reserves of natural gas. Given its vast hydrocarbon resources, Russia is the world's largest producer of crude oil and the second largest producer of natural gas (after the United States). O&G exports are central to the Russian economy, with hydrocarbon sales accounting for more than half of the government's total budget revenues. Russia currently exports an overwhelming majority of its crude oil and natural gas to Europe but is attempting to increase its exports to East Asia, as Europe is working to diversify its natural gas sources. The Russian and Chinese governments have agreed to long-term natural gas sales and construction of a transmission pipeline. Details of the agreement, however, need to be negotiated, and the pipeline has not yet been constructed. Russia currently has one LNG export facility at Sakhalin Island, which transports LNG to Japan and South Korea. Exploration and development of additional hydrocarbon resources in the Arctic, the Caspian Sea and other regions could change the dynamics of Russia's O&G industry, but given current strains on the Russian economy and low international price of oil, Russia is expected to delay investments in these high-cost and risky areas.

The Russian government strives to maintain a tight control on the O&G industry, viewing it to be of strategic significance for its national security. The state has closely controlled the sector by promoting the creation of domestic vertically integrated oil companies (VIOCs) (which account for about 90 percent of the overall oil production and refining), taking political control over re-distribution of ownership within VIOCs, heavily taxing the industry and limiting direct access of foreign companies to exploration and development of oilfields. There are currently only three PSAs in place in Russia: Sakhalin 1 (ExxonMobil, Rosneft, SODECO, ONGC); Sakhalin 2 (Shell, Gazprom, Mitsui and Mitsubishi) and Kharyaga (Total, Statoil, Zarubezhneft and Nenets Oil Company). No PSAs have been added to date due to the restrictive nature of the PSA law, and the share of all the three projects in Russia's overall oil output remains low.

Market Analysis

Russia represents a large global import market for O&G field equipment and is the sixth largest equipment importer globally. In 2015, U.S. exports of O&G equipment dropped to $409 million (from $674 million in 2014) and represented less than 2 percent of global U.S. exports. Due to ongoing sanctions, U.S. market share is expected to decrease further in 2016.

In 2014, the United States was the fourth largest source for Russian imports of O&G equipment, holding an 8 percent market share. Russia's largest sources for O&G equipment were China, Germany and Italy with 17, 16 and 11 percent market shares, respectively. Machinery and mechanical appliances, filter/purify machines for gases and tankers for the transport of goods represented more than half of Russia's O&G equipment imports. In 2015, the largest U.S. exports to Russia were parts for boring or sinking machinery (20 percent) and machinery and mechanical appliances (44 percent).

Policy Context: Opportunities and Challenges

In response to Russia's occupation and attempted annexation of Crimea in 2014 and its continued violation of Ukraine's sovereignty, the United States, the European Union and other international partners have imposed a number of sanctions on individuals and entities, as well as a trade embargo on the territory of Crimea. Those targeted by the sanctions include certain O&G companies. For more detailed information, U.S. companies should contact the U.S. Department of Commerce's Bureau of Industry (BIS) and Security and the U.S. Treasury Department's Office of Foreign Assets Control (OFAC).

Western companies, including U.S. firms, have traditionally enjoyed a good reputation for quality, modern O&G equipment and skillful O&G project management in Russia. Many western companies that ventured into Russia at earlier stages and successfully managed the market's uncertainty and instability have seen their products and services accepted by the local industry. Due to Russia's actions in Crimea and Ukraine and the imposition of economic sanctions, however, many joint projects have been put on hold. Low crude oil prices have further stressed Russia's O&G sector, and U.S. companies may find it more difficult than before to sell to the Russian market.

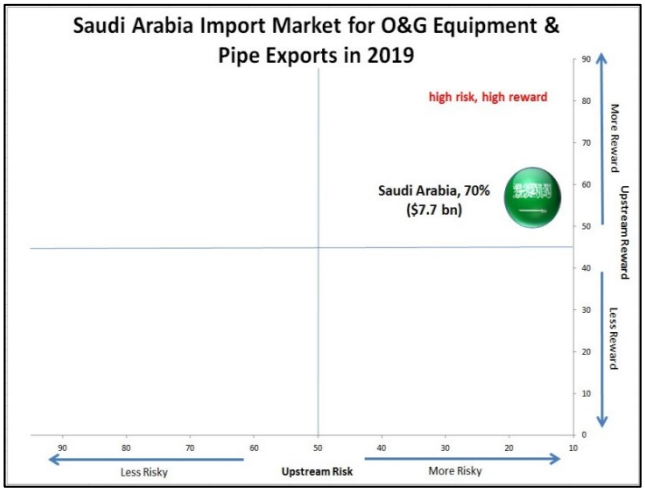
Declining oil prices, coupled with a lack of economic reforms and economic sanctions, have slowed economic growth, thereby putting pressure on Russia's currency and banking sector and reducing access to foreign financing and new technologies. As a result, Russian NOCs have revised their investment plans and are less likely to support the development of technically challenging and uneconomic deposits (i.e. deepwater, Arctic offshore and shale resources). To meet production targets, Russian O&G companies have redoubled efforts to maximize conventional deposits, including stimulation and drilling in existing brownfields, and some greenfield development. Until Russia can fulfill the commitments outlined in the Minsk Protocol, including respect for Ukraine's borders and sovereignty, sanctions will not be lifted. In this policy context, in addition to the current stagnation of the Russian economy, U.S. company participation in Russia's O&G sector will be limited.

The current economic sanctions are likely to cause U.S. companies to encounter more competition in Russia's O&G industry, as the Russian government is encouraging greater import substitution. Since sanctions were put in place, there has been growing sentiment in Russia for more domestically sourced technology and services, not only in the sub-sectors which were specifically sanctioned (deepwater, Arctic offshore and shale) but also with regard to other types of equipment and technology used in conventional O&G exploration and production. The key technologies for import substitution in 2016 include horizontal drilling, well completion and stimulation, and technology to facilitate the lowering of equipment into the wellbore.

Saudi Arabia

Overall Rank: 5

While conventional onshore oil production will remain central to the economy of the Kingdom of Saudi Arabia (Saudi Arabia), the country will increasingly look towards the development of unconventional gas resources and offshore oil and gas opportunities. The United States remains a central partner to Saudi Arabia in the O&G sector and will continue to push for commercial relationships through the U.S.-Saudi Strategic Partnership for the 21st Century.



Background

Saudi Arabia possesses the world's largest proven reserves of crude oil, is the world's second largest crude oil producer after the United States and is the largest exporter of total petroleum liquids. It is also the largest producer in OPEC and is a part of the Cooperation Council for the Arab States of the Gulf (alternatively, the Gulf Cooperation Council), which has pushed for greater regional integration. Revenues from oil sales remain central to the Saudi economy, accounting for approximately 79 percent of the country's export revenues. Saudi Arabia also holds the world's fifth largest natural gas reserves and is continuing to diversify its O&G sector from its oil production into natural gas, refining and petrochemicals, among other industries.

Saudi Arabia's 268 billion barrels of crude reserves (including those in the shared Saudi-Kuwaiti Neutral Zone) comprises roughly 16 percent of the world's proved reserves and more than 20 percent of OPEC's reserves. Saudi Arabia is the world's largest crude oil producer by total capacity. Whereas most oil companies have retrenched in the light of sustained low oil prices, Saudi Arabia has continued to invest heavily in oil and gas exploration and development. Saudi Arabia is attempting to balance declining oil production at older sites with the development of new fields and increase the share of light crude over medium or heavy grades because lighter grades are generally associated with onshore fields in Saudi Arabia. The Kingdom plans to offset declines in fields with new exploration and development, but has also started utilizing EOR techniques.

Saudi Arabia holds 294 Tcf of natural gas reserves, accounting for more than 4 percent of the world's proved reserves. Growth in natural gas development is intrinsically connected to increases in oil production, and any additional natural gas production could displace the domestic use of crude oil in power generation or water desalination. Further natural gas exploration and production is hindered by high production costs, low (state controlled) natural gas prices and insufficient new discoveries.

Saudi Arabia's O&G sector is controlled by the NOC, Saudi Arabian Oil Company (Saudi Aramco), which has the largest total production of any oil company in the world. Saudi Arabia's Ministry of Petroleum and Mineral Resources oversees Saudi Aramco. Additional policy guidance, particularly in regards to long-term strategy on the industry, was provided by the Supreme Council for Petroleum and Minerals Affairs (SPMC) until it was dissolved in January 2015. SPMC has been replaced by a 10-member supreme board for Saudi Aramco, which is headed by Deputy Crown Prince Mohammed bin Salman, the chairman of Saudi Arabia's Council of Economic Affairs and Development.

Market Analysis

In 2015, U.S. exports of O&G equipment totaled $584 million (down from $903 million in 2014) and represented nearly 3 percent of total U.S. O&G equipment exports globally. The largest U.S. exports included parts for boring or sinking machinery (44 percent) and positive displacement pumps (20 percent). In 2013 and 2014, Saudi Arabia relied on several sources for its O&G equipment imports, including the United States (22 percent of 2013 imports), Singapore (18 percent), South Korea (9 percent), China (8 percent) and Japan (8 percent). Saudi Arabia is also an exporter of O&G equipment, exporting $1.1 billion in 2014 and $683.9 million in 2013. Its primary export market is Asia, accounting for 72 percent of its exports in 2013.

Policy Context: Opportunities and Challenges

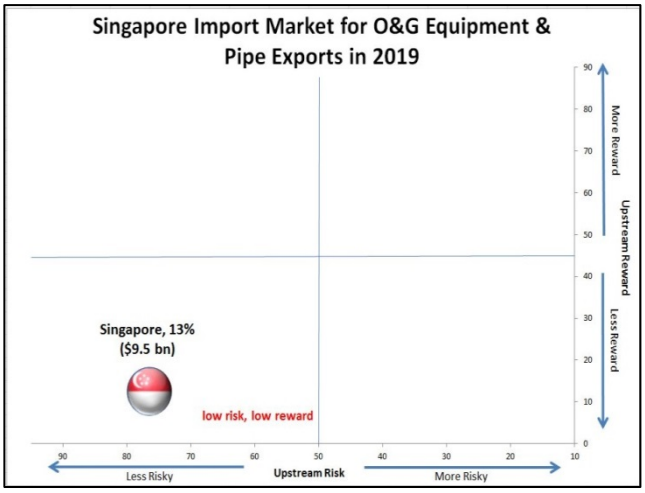
Saudi Aramco has signaled its intent to deepen the role of unconventional hydrocarbons, including an $8 billion investment in shale and tight sand formations in northern Saudi Arabia, around Ghawar and in the eastern Faurah Basin. At the same time, it has made a similar push toward offshore deposits in both the Arabian Gulf and the Red Sea. This focus on increasing the exploitation of new energy sources will invite American equipment and expertise, particularly around site development, rig preparation, drilling, hydraulic fracturing, completion, well tie-in, production and maintenance. Entrants into the market, however, should be cognizant of the budgetary impact of lower oil prices and rising public spending, which have already forced the government to cut some planned capital expenditures and have increased the country's fiscal deficit. The budget deficit has influenced the decision by the Saudi government to consider an initial public offering of Saudi Aramco as a piece of wider economic reforms. In addition, other challenges remain in the country, particularly regarding subsidy reforms, commercial dispute settlements, local labor policies, conformity assessments and industrial standards.

While the security situation in Saudi Arabia is stable, O&G infrastructure has been targeted in the past by terrorist attacks. The most notable example was a failed suicide bombing in February 2006 of the Abqaiq petroleum processing facility, the largest in the world. Transnational terrorist groups, including al-Qaeda and ISIL, have called on supporters to attack Saudi Arabia's energy sector. In response to these threats, Saudi Arabia has increased the military presence assigned to protect installations, rounded up suspects that have been accused of planning attacks and implemented redundancy strategies to ensure that the market is not disrupted by an attack.

Singapore

Overall Rank: 11

Despite its lack of hydrocarbon resources, Singapore offers significant commercial opportunities for U.S. exporters of O&G equipment. As a regional hub for O&G equipment trade, U.S. exports to Singapore are largely dependent on demand from Asia for new oil rigs and offshore equipment manufactured in Singapore. Singapore's business environment and the Trans-Pacific Partnership agreement is expected to facilitate commercial opportunities for U.S. exporters. Despite declining demand for oil in Asia, it is anticipated that the United States will remain the largest source for Singaporean imports of O&G equipment in 2016.



Background

Although it is not a producer of crude oil or natural gas, Singapore serves as an important hub for O&G equipment trade to Asia. Singapore is the market leader for floating production, storage and offloading (FPSOs) conversions and offshore jack-up rigs, and many oilfield service and subsea companies have operations in Singapore due to the presence of major offshore and marine firms, such as Keppel Corporation and Sembcorp Marine. Singapore has become one of the most important shipping centers in Asia and is one of the world's top five oil trading and refining hubs. Singapore's downstream sector is well-developed, and it is one of the top 10 exporters of refined oil products in Asia. Underground caverns for oil storage and a LNG terminal are also being expanded in phases to enhance Singapore's position as the premier regional center for the O&G industry.

Market Analysis

Singapore represents a large global import market for O&G field equipment. In 2015, Singapore was the fourth largest destination for U.S. exports of O&G equipment, with $1.07 billion in exports (5 percent of global U.S. exports). Since 2004, U.S. O&G equipment exports to Singapore have ranged between $1 and $1.8 billion, with U.S. exports peaking in 2008. Although U.S. market share is projected to decrease slightly, U.S. exports of O&G equipment are expected to increase marginally to $1.2 billion in 2019.

In 2014, the United States was by far the largest source for Singaporean imports of O&G equipment, holding a 29 percent market share. After the United States, Singapore's largest sources for O&G equipment were China, Japan and Malaysia, each holding under a 10 percent market share. Offshore equipment, including parts for boring or sinking machinery (48 percent of imports) and parts and attachments for derricks (16 percent), represented the majority of Singapore's O&G equipment imports. In 2015, the largest U.S. exports to Singapore were floating production platforms, parts for boring or sinking machinery and reciprocating positive displacement pumps, which represented more than 60 percent of total U.S. exports of O&G equipment to Singapore.

Singapore is a net exporter of O&G equipment and was the seventh largest exporter in the world in 2014, with more than $9 billion in total equipment exports. Its top export markets were Indonesia ($1.5 billion in exports), Malaysia ($1.2 billion) and China ($984 million), and exports to Asia comprised more than 50 percent of total exports. Singapore's largest exports were parts for boring or sinking machinery and floating or submersible drilling/production platforms, which represented nearly two-thirds of total Singaporean exports of O&G equipment. In

2014, Singaporean imports of O&G equipment totaled $6.4 billion, and its import market is expected to exceed $9 billion in 2019.

Policy Context: Opportunities and Challenges

Transparent business practices and benefits from the TPP agreement contribute to Singapore's O&G sector being a low risk market for U.S. investment. Low oil prices, slowed economic growth in Asia and ongoing maritime disputes in the South China Sea, however, all contribute to declining demand within Asia for oil rigs and, by extension, pose challenges to significant increases in U.S. O&G equipment exports to Singapore.

Singapore's hospitable business environment contributes to the country's ability to function as a regional trading hub. For the past 11 years, Singapore has topped the Ease of Doing Business rankings published by the World Bank and has offered low risk commercial opportunities for U.S. exporters of O&G equipment. It also tops the World Bank's rankings for government effectiveness and regulatory quality and ranks very highly on political stability, rule of law and control of corruption. Singapore administers arbitrations through the Singapore International Arbitration Centre and is widely recognized in the region as a competent venue for international arbitration that is both neutral and geographically convenient.

The TPP agreement will facilitate Singaporean O&G equipment manufacturers to increase U.S.-sourced components, making it easier for U.S. companies to export O&G equipment to Singapore. The TPP will eliminate all tariffs of O&G equipment, allowing all TPP originating goods to be traded at preferential tariff rates among the TPP countries. Without TPP, Singaporean manufacturers had to include at least 40 percent local content to receive preferential tariff rates when exporting within the Association of Southeast Asian Nations (ASEAN). Under TPP, however, Singaporean exports of O&G equipment with high U.S. content will be able to receive preferential tariff rates when exported to another TPP country due to the accumulation provisions in the agreement. As a result, Singaporean O&G equipment manufacturers will be encouraged to increase U.S.-sourced components to reap tariff benefits, especially for exports to Malaysia, one of the top recipients of O&G equipment exports from Singapore.

Falling rig counts in Asia are likely to reduce demand for new oil rigs and offshore equipment manufactured in Singapore, and this could subsequently reduce demand for U.S. O&G equipment exports to Singapore. Since June 2014, rig counts in Asia have declined by nearly 25 percent from 251 rigs to only 193 rigs in operation in January 2016. Low oil prices have slowed investment in upstream activities and have reduced capital expenditures in oil producing countries, which has greatly reduced demand for new rigs as many oil producers have halted new projects.

In addition, slowed economic growth in major export markets and ongoing maritime disputes in the South China Sea are likely to reduce demand for new oil rigs and offshore equipment from Singapore. In 2015, the Indonesian economy grew less than 5 percent, the slowest since the global financial crisis, and the Chinese economy grew at its slowest rate in 25 years. Slowed growth in the region has resulted in declining oil demand and has contributed to the financial infeasibility of new projects. The feasibility of new projects in the South China Sea is further weakened by territorial disputes and competing claims for O&G resources, which have hindered oil exploration in the region.

Addendum: Resources for U.S. Exporters

The U.S. Government has numerous resources available to help U.S. exporters: from additional market research, to guides to export financing, to overseas trade missions, to staff around the country and the world. A few key resources are highlighted below. For additional information about services from the International Trade Administration (ITA), please visit www.export.gov.

Country Commercial Guides
http://export.gov/ccg/
Written by U.S. Embassy trade experts worldwide, the *Country Commercial Guides* provide an excellent starting point for what you need to know about exporting and doing business in a foreign market. The reports include sections addressing: market overview, challenges, opportunities, and entry strategies; political environment; selling U.S. products and services; trade regulations, customs, and standards; and much more.

Basic Guide to Exporting
http://export.gov/basicguide/
A Basic Guide to Exporting addresses virtually every issue a company looking to export might face. Numerous sections, charts, lists and definitions throughout the book's 19 chapters provide in-depth information and solid advice about the key activities and issues relevant to any prospective exporter.

Trade Finance Guide: A Quick Reference for U.S. Exporters
http://www.export.gov/tradefinanceguide/index.asp
Trade Finance Guide: A Quick Reference for U.S. Exporters is designed to help U.S. companies, especially small and medium-sized enterprises, learn the basics of trade finance so that they can turn their export opportunities into actual sales and achieve the ultimate goal of getting paid on time for those sales. Concise, two-page chapters offer the basics of numerous financing techniques, from open accounts to forfaiting and government assisted foreign-buyer financing.

Trade Missions
http://www.export.gov/trademissions/
Department of Commerce trade missions are overseas programs for U.S. firms that wish to explore and pursue export opportunities by meeting directly with potential clients in local markets.

Trade missions include, among other activities, one-on-one meetings with foreign industry executives and government officials that are pre-screened to match specific business objectives.

Upcoming trade missions include:

- Subsea & Onshore Technology Trade Mission to Brazil
  October 19-21, 2016

Certified Trade Fairs
http://www.export.gov/eac/show_short_trade_events.asp?CountryName=null&StateName=null&IndustryName=null&TypeName=International%20Trade%20Fair&StartDate=null&EndDate=null
The Department of Commerce's trade fair certification program endorses overseas trade shows that are reliable venues and good markets for U.S. firms to sell their products and services abroad. These shows serve as vital access vehicles for U.S. firms to enter and expand into foreign markets. The certified show/U.S. pavilion ensures a high-quality, multi-faceted opportunity for American companies to successfully market overseas. Among other benefits, certified trade fairs provide U.S. exhibitors with help facilitating contacts, market information, counseling and other services to enhance their marketing efforts.

Upcoming TFCs Include:

- Offshore North Sea 2016 – Stavanger, Norway
  August 29 – September 1, 2016
- ADIPEC – Abu Dhabi, UAE
  November 7-10, 2016
- OSEA 2016 – Singapore
  November 30 – December 2, 2016
- Offshore West Africa – Lagos, Nigeria
  January 24-26, 2017

International Buyer Program
http://export.gov/ibp/
The International Buyer Program (IBP) brings thousands of international buyers to the United States for business-to-business matchmaking with U.S. firms exhibiting at major industry trade shows. Every year, the International Buyer Program results

in millions of dollars in new business for U.S. companies by bringing pre-screened international buyers, representatives and distributors to selected shows. U.S. country and industry experts are on site at IBP shows to provide hands-on export counseling, market analysis, and matchmaking services. Each IBP show also has an International Business Center where U.S. companies can meet privately with prospective international buyers, prospective sales representatives, and business partners and obtain assistance from experienced ITA staff.

Upcoming IBPs Include:

- Offshore Technology Conference 2017 – Houston, TX
  May 1-4, 2017
- Louisiana Gulf Coast Oil Expo 2017 (LAGCOE) – Lafayette, LA
  October 24, 2017

The Advocacy Center

http://www.export.gov/advocacy/

The Advocacy Center coordinates U.S. government interagency advocacy efforts on behalf of U.S. exporters that are bidding on public-sector contracts with overseas governments and government agencies. The Advocacy Center helps to ensure that sales of U.S. products and services have the best possible chance competing abroad. Advocacy assistance is wide and varied but often involves companies that want the U.S. Government to communicate a message to foreign governments or government-owned corporations on behalf of their commercial interest, typically in a competitive bid contest.

U.S. Commercial Service

http://www.export.gov/usoffices/index.asp

With offices throughout the United States and in U.S. Embassies and consulates in nearly 80 countries, the U.S. Commercial Service utilizes its global network of trade professionals to connect U.S. companies with international buyers worldwide. Whether looking to make their first export sale or expand to additional international markets, companies will find the expertise they need to tap into lucrative opportunities and increase their bottom line. This includes trade counseling, actionable market intelligence, business matchmaking, and commercial diplomacy.

Appendix I: Methodology

ITA's methodology is applied to a sample size of 74 countries to determine the greatest market opportunities for O&G equipment exports. The sample size includes countries with O&G reserves as reported by the U.S. Energy Information Administration. The 74 countries included in the *2015 Upstream Oil and Gas Equipment Top Markets Report* remain unchanged in this year's report, with the exception of the removal of the United States from the sample group.

To calculate market opportunities for O&G equipment exports, the eight indicators listed below are weighted and summed together to provide a relative ranking that results in a list of possible top market prospects. The list includes countries in diverse geographic areas and is consistent with where there is projected upstream investment. A country may be included as a top market prospect even if it is not ranked highest for one or two indicators, provided the country has sufficiently favorable rankings in other indicators. When summing across the "export opportunity" indicators ranked by quartile, the initial top 20 markets emerge, spanning all continents except Antarctica.

Proximity to the United States

Proximity, or the distance goods must travel from point of origin to point of destination, is statistically significant in explaining changes in international trade. The indicator is used to as a proxy for transportation costs, which are not consistently available for O&G field equipment shipments. The study employs a proximity variable based on the French Research Center in International Economics that provides bilateral distances (in kilometers) for the countries selected using a population-weighted center. The country distances from the United States are divided into quartiles (with 4 being the closest), which are then added to the final score to rank countries against one other. Because proximity was found to be very relevant to export trends, the Proximity Rank is given 10 percent of the overall weight of the final score [see Figure 9].

Figure 9: Legend, Proximity to the United States Indicator

Indicator	Quartile	Range (Numerical)	Score/ Rank
Proximity to the United States	Closest	1,154.5 - 7,926.3 km	4
	2nd Closest	8,039.7 - 10,307.5 km	3
	3rd Closest	10,349.1 – 12,099.7 km	2
	Furthest	greater than 12,115.1 km	1

U.S. Exports

In 2015, U.S. upstream O&G equipment and pipe exports totaled $22.6 billion. According to ITA projections, $31 billion in O&G field equipment will be exported in 2019. The U.S. Exports variable captures future trends and preferences for countries' imports from the United States and is weighted as 30 percent of a country's overall score.

To determine the U.S. Exports indicator score, we employ data on U.S. exports of pipe and equipment to each country as reported by the United States. These figures are not necessarily identical to those each country reports as pipe and equipment imports from the United States, as country standards for classifying imports may differ from U.S. standards for classifying exports. Despite this discrepancy, we believe that export figures reported by the United States are the most appropriate data available for the purposes of this report. To provide a more realistic projection based on the current low oil price environment and its effect on O&G equipment trade, 2016 U.S. export projections are adjusted to include a 9 percent decrease.

The U.S. Exports variable is subdivided into equipment and pipe exports, respectively. These subdivisions are further divided into 2015 values, 2019 projected values and the projected CAGR 2015-2019. Each figure is grouped

into four quartiles, and the quartile rankings are averaged to provide a score for the U.S. Exports indicator for each country. The countries with the greatest amount of U.S. exports in receive a rank of 4, while the countries with the least amount of U.S. exports receive a rank of 1. The countries with the highest growth rates between 2015 and 2019 receive a rank of 4 while the countries with the lowest growth rates receive a rank of 1. Quartile ranges for equipment and pipe export values differ, and some countries are highly ranked for equipment exports but not for pipe exports. For example, South Africa is in the top quartile for U.S. equipment exports but not for U.S. pipe exports in 2019 [see Figure 10].

Figure 10: Legend, U.S. Exports Indicator

Indicator			Quartile	Range (Numerical)	Score/ Rank
Projected U.S. Exports in 2019 *	equipment	2015 value	Largest	$280.9 - $3,883.8 million	4
			2nd Largest	$93.2 - $280.4 million	3
			3rd Largest	$23.8 - $83.8 million	2
			Smallest	less than $22.1 million	1
		Projected 2019 value	Largest	$327.1 - $5,252.1 million	4
			2nd Largest	$123.4 - $324.0 million	3
			3rd Largest	$40.4 - $109.4 million	2
			Smallest	less than $33.4 million	1
		CAGR 2015-19	Largest	16.6 – 59.7%	4
			2nd Largest	6.9 – 16.5%	3
			3rd Largest	(1.1%) – 6.8%	2
			Smallest	less than -1.8%	1
	pipe	2015 value	Largest	$16.8 - $565.8 million	4
			2nd Largest	$5.7 -$15.2 million	3
			3rd Largest	$2.6 -$5.4 million	2
			Smallest	less than $2.4 million	1
		Projected 2019 value	Largest	$31.9 - $1,514.6 million	4
			2nd Largest	$14.2 - $31.1 million	3
			3rd Largest	$3.1 -$13.3 million	2
			Smallest	less than $3.0 million	1
		CAGR 2015-19	Largest	28.4 – 95.0%	4
			2nd Largest	13.1 – 27.9%	3
			3rd Largest	4.2 – 12.7%	2
			Smallest	less than 3.8%	1

Import Market

Global upstream O&G equipment trade is estimated to reach $223 billion in 2019, with a projected $31 billion originating from U.S. equipment suppliers. The Import Market indicator reflects demand and forecasts openness and growth for U.S. exporters and is weighted to provide 20 percent of the final score. To provide more realistic projections based on the current low oil price environment and its effect on O&G equipment trade, 2015 import market figures are adjusted to include a 6 percent decrease in the 2015 projections and 2016 figures are adjusted to include a 9 percent decrease in the 2016 projections.

The Import Market variable is subdivided into equipment and pipe, which are further divided into the projected market size in 2019, 2015-2019 market growth rate and projected U.S. share of the market in 2019. Each figure is grouped into four quartiles, and the quartile rankings are averaged to provide a score for the Import Market indicator. A rank of 4 is issued to countries with the largest values within each concept. Calculating an "import market" relies on a country's import statistics; where unavailable (e.g. Iraq, Myanmar), we use reverse trade data [see Figure 11].

Figure 11: Legend, Import Market Indicator					
Indicator			Quartile	Range (Numerical)	Score/ Rank
Projected Market Size in 2019*	equipment	2015 value	Largest	$2,898.4 - $14,712.3 million	4
			2nd Largest	$985.8 - $2,888.9 million	3
			3rd Largest	$411.8 - $984.1 million	2
			Smallest	less than $337.3 million	1
		Projected 2019 value	Largest	$3,976.1 - $17,891.3 million	4
			2nd Largest	$1,085.3 - $3,782.3 million	3
			3rd Largest	$560.1 - $1,060.6 million	2
			Smallest	less than $555.4 million	1
		CAGR 2015-19	Largest	6.2 – 8.3%	4
			2nd Largest	5.0 – 6.2%	3
			3rd Largest	2.3 - 4.4%	2
			Smallest	less than 2.3%	1
		U.S. Share of the market in 2019	Largest	greater than 21.5%	4
			2nd Largest	7.7 - 20.1%	3
			3rd Largest	3.3 - 7.5%	2
			Smallest	less than 3.2%	1
	pipe	2015 value	Largest	$584.0 - $3,412.8 million	4
			2nd Largest	$240.0 - $543.1 million	3
			3rd Largest	$101.8 - $235.7 million	2
			Smallest	less than $101.4 million	1
		Projected 2019 value	Largest	$850.2 - $4,938.9 million	4
			2nd Largest	$319.2 - $693.8 million	3
			3rd Largest	$104.8 - $306.2 million	2
			Smallest	less than $88.2 million	1
		CAGR 2015-19	Largest	6.4 – 9.8%	4
			2nd Largest	5.0 – 6.4%	3
			3rd Largest	2.5 – 4.7%	2
			Smallest	less than 2.1%	1
		U.S. Share of the market in 2019	Largest	11.3 - 87.1%	4
			2nd Largest	4.2 - 10.6%	3
			3rd Largest	1.3 – 4.1%	2
			Smallest	less than 1.2%	1

Below Ground Resources

The Below Ground Resources variable measures a country's estimated, economically-viable O&G reserves. The variable is subdivided into a country's estimated oil reserves and natural gas reserves, respectively, and further divided into projected reserves for 2019 and projected production in 2019 based on the U.S. Energy Information Administration history and BMI forecasts from December 29, 2015. The figures are then divided into quartiles, ranked and averaged to form the Below Ground Resources score. During the regression analysis, we determined that below ground resources do not have a significant impact on a country's imports. As a result, this variable is only weighted 5 percent of the overall score [see Figure 12].

Figure 12: Legend, Below Ground Resources Indicator					
Indicator			Quartile	Range (Numerical)	Score/ Rank
Below Ground Resources, 2019	Gas	Projected reserves	Largest	1,797.0 - 50,060.9 Bcm	4
			2nd Largest	273.9 - 1,755.5 Bcm	3
			3rd Largest	26.3 - 249.7 Bcm	2
			Smallest	less than 23.6 Bcm	1
		Projected production	Largest	44.4 - 669.1 Bcm	4
			2nd Largest	10.3 - 44.0 Bcm	3
			3rd Largest	1.5 - 10.2 Bcm	2
			Smallest	less than 1.5 Bcm	1
	Oil	Projected reserves	Largest	4,736.4 - 298,993.4 mn bbl	4
			2nd Largest	522.4 - 4,692.2 mn bbl	3
			3rd Largest	60.2 - 456.4 mn bbl	2
			Smallest	less than 57.8 mn bbl	1
		Projected production	Largest	357.1 - 4,574.3 mn bbl	4
			2nd Largest	61.5 - 352.2 mn bbl	3
			3rd Largest	7.0 - 60.7 mn bbl	2
			Smallest	less than 6.8 mn bbl	1

Upstream Project Investments

Using publicly available information, the Upstream Project Investment variable summarizes investments for specific O&G projects by country. BMI maintains a database of on-going upstream projects, including project parameters and the known investments. Data are available for 53 countries as of December 30, 2015 when data were pulled. Some countries, such as China, Mexico and Brazil, do not publically report all upstream project investments as these investments may be associated with a state-owned enterprise. Similar to other variables, country investment figures are ranked into quartiles to determine each country's score for the Upstream Project Investment indicator. The indicator is only weighted 5 percent of the overall score as upstream investments are not shown to have significant impact on a country's imports [see Figure 13].

Figure 13: Legend, Known Upstream Investment Projects Indicator				
Indicator		Quartile	Range (Numerical)	Score/ Rank
Known Upstream Investment Projects	Only 53 countries' data available	Largest	$21,725 - $285,584 mn	4
		2nd Largest	$5,000 - $20,900 mn	3
		3rd Largest	$135 - $4,735 mn	2
		Smallest	no data available/$0	1

Institutional Risk

The Institutional Risk variable represents above-ground risk as institutions play a significant role in the risk profile facing companies. Corruption, the absence of rule of law and civil unrest can all negatively affect trade with otherwise high-potential markets. Together, the Institutional Risk indicator is given a 5 percent weight towards the overall score.

The World Bank's Worldwide Governance Indicators assess the quality of institutions by using data from a variety of organizations to comprise six concepts: (i) Control of Corruption, (ii) Rule of Law, (iii) Regulatory Quality, (iv) Government Effectiveness, (v) Political Stability and Absence of Violence and (vi) Voice and Accountability. The Worldwide Governance Indicators have been updated annually since 1996, and the most recently available data set comes from 2014.

To calculate the Institutional Risk score, each country is ranked according to their percentile scores and divided into quartiles for each of the six identified measures. The quartile ranks are summed and averaged to calculate the Institutional Risk score. The scores range from 4 (least risky), for countries like Canada, Australia and Norway, to 1 (most risky), for countries like Iraq and Sudan [see Figure 14].

Figure 14: Legend, Institutional Risk Indicator

Indicator		Quartile	Range (Numerical)	Score/ Rank
Institutional Risk	Control of Corruption: Percentile Rank	Largest	70.7-100	4
		2nd Largest	48.6-70.2	3
		3rd Largest	26.0-47.1	2
		Smallest	0-22.6	1
	Government Effectiveness: Percentile Rank	Largest	83.7-100	4
		2nd Largest	61.1-80.3	3
		3rd Largest	29.8-57.7	2
		Smallest	2.9-27.9	1
	Voice and Accountability: Percentile Rank	Largest	70.4-100	4
		2nd Largest	47.8-69.0	3
		3rd Largest	19.7-47.3	2
		Smallest	0-19.2	1
	Rule of Law: Percentile Rank	Largest	80.3-99.5	4
		2nd Largest	55.3-79.8	3
		3rd Largest	23.6-54.3	2
		Smallest	0.5-23.1	1
	Regulatory Quality: Percentile Rank	Largest	80.3-100	4
		2nd Largest	62.0-78.8	3
		3rd Largest	27.9-59.6	2
		Smallest	0.5-26.0	1
	Political Stability and Absence of Violence/Terrorism: Percentile Rank	Largest	68.0-99.0	4
		2nd Largest	46.1-66.0	3
		3rd Largest	20.9-45.6	2
		Smallest	2.4-18.9	1

Business Environment

The Business Environment variable considers the quality and efficiency of business regulations facing companies in foreign markets. Similar to institutional risk, low quality, non-transparent and inefficient business processes can negatively affect trade with otherwise high-potential markets. This variable reflects the general business environment for each country and does not consider business regulations or processes specific to the O&G sector. The Business Environment indicator is weighted 10 percent of the overall score.

The Business Environment score is calculated using data from the World Bank's Ease of Doing Business ranking, which is based on country rankings for 10 topics within its *Doing Business* report. The *Doing Business* report has been published annually by the World Bank since 2003, and the most recently available data set comes from the 2016 edition of the report.

To calculate the Business Environment score, each country is ranked according to their Ease of Doing Business scores and divided into quartiles. The quartile rankings range from 4 (most business-friendly), for countries like Singapore, New Zealand and Denmark, to 1 (least business-friendly), for countries like Venezuela and Libya [see Figure 15]. Ease of Doing Business scores for Turkmenistan are unavailable.

Figure 15: Legend, Business Environment Indicator			
Indicator	**Quartile**	**Range (Numerical)**	**Score/ Rank**
Business Environment	Highest	74.7-87.3	4
	2nd Highest	66.8-74.0	3
	3rd Highest	54.4-66.0	2
	Lowest	no data available/31.8-54.0	1

Qualitative Ranking

The Qualitative Rating variable incorporates O&G industry knowledge from ITA, Industry and Analysis Unit's Office of Energy and Environmental Industries. The variable attempts to capture qualitative issues in a quantitative measure for the purposes of the Top Markets Report. The Qualitative Rating indicator complements the Business Environment indicator to quantify potential commercial opportunities and considers the business environment specific to the O&G sector.

Scores for this variable are calculated by evaluating each country's availability of O&G resources/activeness of the O&G industry as well as market access issues such as regulatory framework and environmental regulations. Countries with significant commercial opportunities receive a score of 4 while countries with no commercial opportunities or countries currently under sanctions receive a score of 1. The Qualitative Rating indicator is weighted 15 percent of the overall score [see Figure 16].

Figure 16: Legend, Qualitative Rating Indicator		
Indicator	**Quartile**	**Score/ Rank**
Qualitative Rating	Significant commercial opportunities	4
	Some commercial opportunities	3
	Few commercial opportunities	2
	No commercial opportunities/Sanctioned countries	1

Analysis Used to Determine Indicator Weights

To determine which markets might be most promising for U.S. exporters based on the information available, we had to determine the relative importance of the eight measured indicators on future U.S. exports. Weights were assigned to each indicator following a regression analysis based on econometrics and industry knowledge from ITA.

Final Weights Calculated

Proximity to the U.S.: Slightly Strong Weight (10 percent)
U.S. Exports: Relatively Strong Weight (30 percent)
Import Market: Relatively Strong Weight (20 percent)
Below Ground Resources: Weak Weight (5 percent)
Upstream Projects: Weak Weight (5 percent)
Institutional Risk: Weak Weight (5 percent)
Business Environment: Slightly Strong Weight (10 percent)
Qualitative Rating: Slightly Strong Weight (15 percent)

Appendix II: Full Country Rankings

74 countries with oil and gas reserves	Proximity to the U.S.	U.S. Exports	Import Market	Below Ground Resources	Upstream Projects (on-going)	Institutional Risk	Business Environment	Qualitative Rating (Commercial Opportunities)	Weighted Scenario	
	French Research Center for International Economics	ITA	ITA	EIA/BMI forecast	Publicly Available Upstream Investment, BMI	World Bank	World Bank	ITA	Weighted Score	Final Rank
United Arab Emirates	**4**	**3.17**	**3.50**	**4**	**3**	**3.33**	**4**	**4**	**3.57**	**1**
Canada	**2**	**3.17**	**3.63**	**4**	**4**	**4.00**	**4**	**4**	**3.48**	**2**
Australia	**1**	**3.50**	**3.50**	**3.25**	**4**	**4.00**	**4**	**4**	**3.41**	**3**
Mexico	**4**	**3.00**	**3.50**	**3.75**	**3**	**2.50**	**3**	**4**	**3.36**	**4**
Saudi Arabia	**4**	**3.17**	**3.38**	**4**	**4**	**2.33**	**2**	**4**	**3.34**	**5**
Colombia	**2**	**3.83**	**3.50**	**3**	**2**	**2.00**	**3**	**4**	**3.30**	**6**
Brazil	**1**	**3.83**	**3.75**	**3.5**	**4**	**2.33**	**2**	**4**	**3.29**	**7**
Norway	**3**	**2.33**	**3.00**	**4**	**4**	**4.00**	**4**	**4**	**3.20**	**8**
United Kingdom	**3**	**3.33**	**3.25**	**3**	**4**	**3.83**	**4**	**2**	**3.19**	**9**
Ghana	**4**	**3.17**	**2.75**	**2.5**	**3**	**2.50**	**2**	**4**	**3.10**	**10**
Singapore	**2**	**3.67**	**3.25**	**1**	**1**	**3.67**	**4**	**3**	**3.08**	**11**
Malaysia	**2**	**2.67**	**2.63**	**3.5**	**4**	**3.00**	**4**	**4**	**3.05**	**12**
Argentina	**4**	**3.33**	**2.88**	**3**	**3**	**2.00**	**2**	**3**	**3.03**	**13**
China	**1**	**3.33**	**2.88**	**4**	**3**	**2.00**	**2**	**4**	**2.93**	**14**
Indonesia	**1**	**2.83**	**3.38**	**3.5**	**4**	**2.17**	**2**	**4**	**2.91**	**15**
Kuwait	**4**	**2.33**	**2.50**	**3.5**	**4**	**2.50**	**2**	**4**	**2.90**	**16**
Chile	**3**	**3.33**	**3.00**	**1.5**	**2**	**3.83**	**3**	**2**	**2.87**	**17**
Venezuela	**4**	**3.17**	**3.38**	**3.75**	**4**	**1.00**	**1**	**2**	**2.86**	**18**
Iraq	**1**	**3.17**	**3.38**	**3.5**	**4**	**1.00**	**1**	**4**	**2.85**	**19**
Russia	**2**	**3.50**	**3.25**	**4**	**4**	**1.67**	**3**	**1**	**2.83**	**20**
Peru	2	3.00	3.00	3	2	2.33	3	3	2.82	21
Oman	1	3.17	2.50	3.25	3	3.00	2	4	2.81	22
Ecuador	4	2.67	3.13	2.25	3	1.50	2	3	2.81	22
Angola	3	2.83	2.75	3	4	1.17	1	4	2.81	22
Nigeria	1	3.17	2.88	4	4	1.17	1	4	2.78	25
South Korea	2	3.17	3.25	1	1	3.50	4	2	2.78	25
Israel	1	3.17	2.75	2	3	3.50	3	3	2.78	25
India	3	2.67	3.00	3.25	3	2.00	2	3	2.76	28
Thailand	2	2.50	3.13	2.5	3	2.17	3	3	2.71	29
South Africa	3	2.83	2.75	1.5	2	2.83	2	3	2.67	30
Germany	2	2.67	2.88	2.25	1	4.00	4	2	2.64	31
Bahrain	4	2.50	2.25	2.25	1	2.33	3	3	2.63	32
France	3	3.00	2.75	1.25	1	3.83	4	1	2.60	33
Turkey	3	3.00	2.00	1.5	1	2.50	3	3	2.60	33
Egypt	3	2.17	3.00	3.5	3	1.33	2	3	2.59	35
Trinidad and Tobago	2	2.67	2.13	2.75	2	2.50	2	4	2.59	35
Denmark	4	2.00	1.88	2.25	3	4.00	4	2	2.54	37
Libya	3	2.50	3.00	3.25	2	1.00	1	3	2.51	38
Algeria	4	2.17	2.25	3.5	3	1.67	1	3	2.46	39
Mozambique	4	2.67	1.75	2.25	3	1.67	1	3	2.45	40
Romania	2	2.67	2.38	2.25	2	2.83	3	2	2.43	41
Spain	4	2.50	2.25	1.25	1	3.33	4	1	2.43	41

Full Country Rankings (continued)

74 countries with oil and gas reserves	Proximity to the U.S.	U.S. Exports	Import Market	Below Ground Resources	Upstream Projects (on-going)	Institutional Risk	Business Environment	Qualitative Rating (Commercial Opportunities)	Weighted Scenario	
	French Research Center for International Economics	ITA	ITA	EIA/BMI forecast	Publicly Available Upstream Investment, BMI	World Bank	World Bank	ITA	Weighted Score	Final Rank
Equatorial Guinea	4	2.33	2.13	2.5	3	1.17	1	3	2.41	43
Italy	3	2.50	2.50	2	2	3.17	3	1	2.36	44
Poland	1	2.00	2.75	2	2	3.67	4	2	2.33	45
New Zealand	2	2.50	2.13	1.5	2	4.00	4	1	2.30	46
Papua New Guinea	4	2.17	2.50	2.25	3	1.67	1	2	2.30	46
Japan	3	2.33	2.13	1.25	1	4.00	4	1	2.29	48
Kazakhstan	1	2.00	2.50	3.75	4	2.00	3	2	2.29	48
Tanzania	4	2.17	2.25	1.75	1	1.67	1	3	2.27	50
Hong Kong	3	2.33	2.13	1	1	3.83	4	1	2.27	50
Qatar	1	1.67	1.38	4	4	3.33	2	4	2.24	52
Vietnam	1	2.33	2.88	2.75	2	2.00	2	2	2.21	53
Azerbaijan	1	1.83	1.75	3.25	4	1.67	3	3	2.20	54
Gabon	1	2.50	2.38	2.25	2	1.83	1	3	2.18	55
Belgium	2	2.50	2.38	1	1	4.00	3	1	2.18	55
Czech Republic	4	1.83	2.13	1	1	3.67	3	1	2.11	57
Philippines	3	2.00	1.88	2	2	2.33	2	2	2.09	58
Turkmenistan	3	2.00	2.25	3.25	2	1.33	1	2	2.08	59
Bolivia	3	2.33	2.50	2.5	2	1.83	1	1	2.07	60
Bulgaria	4	1.67	2.00	1	1	2.83	3	1	1.99	61
Slovenia	3	2.00	1.25	1	1	3.67	4	1	1.98	62
Taiwan	1	2.17	1.63	1	1	4.00	4	1	1.93	63
Myanmar	2	1.67	1.75	2	3	1.00	1	3	1.90	64
Congo	1	2.00	2.25	2.5	3	1.17	1	2	1.88	65
Greece	2	1.50	1.63	1	2	3.00	3	2	1.88	65
Uzbekistan	2	1.50	1.88	3.25	2	1.17	2	2	1.85	67
Slovakia	3	1.50	1.38	1	1	3.33	4	1	1.84	68
Cameroon	1	2.67	2.25	2	1	1.17	1	1	1.81	69
Hungary	4	1.33	1.50	1	1	3.17	3	1	1.81	69
Ukraine	2	1.67	1.75	2.5	1	1.50	2	2	1.80	71
Pakistan	1	2.00	1.75	2.5	2	1.50	1	2	1.75	72
Croatia	2	1.33	1.13	1.25	1	3.00	3	1	1.54	73
Sudan	3	1.17	1.00	2	1	1.00	1	1	1.30	74

Appendix III: Comparison to the 2015 Upstream Oil and Gas Equipment Top Markets Report

Country Rankings

Seventy percent of the top markets identified in the *2015 Upstream Oil and Gas Equipment Top Markets Report* were again ranked in the top 20 markets in the *2016 Upstream Oil and Gas Equipment Top Markets Report*. In general, the countries which fell from the list saw moderate decreases while those who entered the list for the first time did so through comparatively large jumps in the rankings. The majority of the changes to this year's standings can be attributed to the inclusion of the Business Environment indicator to the methodology. The inclusion of this indicator was especially impactful on emerging markets, helping large OECD countries on the list to remain in relatively stable positions.

Of the six countries which fell from the top 20 markets list, all were negatively affected by the addition of the Business Environment metric.

- **Angola, Oman** and **Nigeria** were most clearly negatively impacted by the inclusion of the Business Environment indicator. While each country had moderate changes to market indicators year-on-year, in each case, the decreases to one indicator was largely offset by positive increases to another. This suggests the inclusion of the Business Environment indicator was a primary driver of the decrease in each country's rankings.
- **Bahrain's** position was also hindered by the Business Environment indicator. Fewer active projects, weakness in the U.S. exports and import market variables also played a role in its decreased position on the list.
- **Ecuador** saw modest losses to both import market and U.S. exports scores; however, much of its decline is driven by the relative rise of other nations.

Countries which entered the top 20 markets for the first time in general did so as a result of significant rank increases since 2015. On average, new entrants to the top 20 rankings moved up 18 positions from 2015. Compared to those countries which left the list, the inclusion of the Business Environment indicator appears to have played a more mixed role among new entrants.

- **Argentina** and **Kuwait** made the largest gains, with each country moving up 25 positions. Despite their relatively weak Business Environment rankings, moderate gains across the board helped support their rankings for this year. Changes in measurement of the proximity variable also had a strong positive impact on both countries.
- **Indonesia** also entered the list with moderate gains in most variables despite a relatively low score for the Business Environment indicator.
- **Singapore** and **Malaysia** both ranked strongly in 2016. While the countries' scores increased from multiple indicators, their high rankings for Business Environment were a major factor in their respective positions.
- **Chile** had limited changes to its indicator values in the 2016 report. The majority of its change in position can be attributed to the addition of the Business Environment indicator and the relative fall of other nations.

Large OECD countries tended to have stable rankings between the 2015 and 2016 reports. This can likely be attributed to both national traits and factors inherent to the methodology of the study. These countries have stable economies, a predictable regulatory environment and business-friendly policies. This stability, however, can also be attributed to larger differences in aggregate scores among higher ranked countries (as these OECD nations tend to be) helping to prevent large shifts in rankings from relatively small changes in the data.

- **Canada** and **Norway** saw slight decreases of one and two positions, respectively. This was largely a result of weaker import markets in both countries.
- **Australia** and the **United Kingdom** rose in the rankings by two and three positions, respectively. Australia benefitted from an improved import market while the UK was affected by changes in scoring the proximity variable.
- **Mexico** remained fourth in this year's ranking. Though changes to the country's O&G industry are expected to alter the market moving forward, they had little impact on individual quartile rankings of indicators this year.
- In contrast, **Israel**, a relatively small OECD nation with a small O&G sector, fell 10 places in ranking in 2016.

Changes to the 2016 Methodology

ITA's methodology to determine the greatest market opportunities for O&G equipment exports largely remains unchanged from the *2015 Upstream Oil and Gas Equipment Top Markets Report*. To strengthen the methodology for the *2016 Upstream Oil and Gas Equipment Top Markets Report*, the following modifications were made:

- **Improving the Qualitative Rating indicator**
  The Qualitative Rating indicator was modified to quantify commercial opportunities rather than market access issues. The factors evaluated were expanded beyond market access issues to include the availability of O&G resources and existing sanctions. By including these additional factors, ITA believes the Qualitative Rating indicator more accurately reflects each market's business environment specific to the O&G sector. In the 2016 report, the Qualitative Rating indicator is weighted 15 percent (20 percent in 2015).

- **Addition of the Business Environment indicator**
  Because the Qualitative Rating indicator is not intended to reflect each market's overall business environment, ITA included the Business Environment indicator as an eighth variable in the methodology. The Business Environment indicator considers the quality and efficiency of business regulations facing companies in foreign markets, as non-transparent and inefficient business processes can negatively affect trade with otherwise high-potential markets. The Business Environment indicator is weighted 10 percent.

- **Standardization of the Proximity to the United States indicator quartiles**
  In the *2015 Upstream Oil and Gas Equipment Top Markets Report*, each market received a score between 1 and 4 based on its distance from the United States. Scores, however, were calculated as decimals and were not evenly distributed into quartiles. For example, only seven markets received a score above 3, and no countries received a score of 4. For the 2016 report, ITA standardized the quartiles, and each market received a score of 1, 2, 3 or 4, which were grouped evenly. In addition, the weight of the Proximity to the United States indicator was decreased to 10 percent (from 15 percent in 2015).

- **Inclusion of the Compound Annual Growth Rate in U.S. Exports and Import Market indicator legends**
  In the *2015 Upstream Oil and Gas Equipment Top Markets Report*, overall growth rates were included in the legends for the U.S. Exports and Import Market indicators. In the 2016 report, the legends for these indicators include the CAGR, as this factor was considered as part of the overall score for the U.S. Exports and Import Market indicators.

- **Revision of HTS codes for calculating O&G equipment trade**
  The *2015 Upstream Oil and Gas Equipment Top Markets Report* used 25 six digit HTS codes to calculate O&G equipment and pipe trade. Twelve additional HTS codes were identified as important to the O&G sector and have been included in the 2016 report. While the use of the additional 12 codes provides a

better estimate of the total global trade of the industry, it is unlikely that the inclusion of additional HTS codes would have changed the market rankings outlined in the 2015 report.

Figure 17:

Oil and Gas Field Equipment by 6-digit harmonized tariff classification		
Pipe related	730411	Line Pipe For Oil Or Gas Lines NSM; Stainless Steel
	730419	Line Pipe For Oil Or Gas Lines NSM; NESOI
	730422	Drill Pipe Used For Oil/Gas Drilling; Stainless Steel
	730423	Drill Pipe Used For Oil/Gas Drilling; Iron/Steel
	730424	Casing and Tubing For Oil/Gas Drilling; NES Stainless Steel
	730429	Casing and Tubing For Oil/Gas Drilling; Iron/Steel
	730511	Pipe; Oil Line ETC Over 16 Inch; Iron/Steel; Long Sub Arc Welded
	730512	Pipe; Oil Line ETC Over 16 Inch; Iron/Steel; Long Welded NESOI
	730519	Pipe; Oil Line ETC Over 16 Inch; Iron/Steel; Closed NESOI
	730520	Casing; Oil/Gas Drilling Over 16 Inch; Iron/Steel
	730611	Pipe For Oil/Gas Pipelines; Welded Stainless Steel
	730619	Pipe For Oil/Gas Pipelines; Iron/Steel NESOI
	730621	Casing ETC for Oil/Gas Drilling; Stainless Steel NESOI
	730629	Casing ETC for Oil/Gas Drilling; Iron/Steel NESOI
	731100	Containers For Compressed/Liquid Gas; Iron/Steel
	761300	Aluminum Containers For Compressed/Liquefied Gas
Equipment related	820713	Rock Drilling/Earth Boring Tools; Working Part of Cermets & Parts Thereof
	841350	Oil Well And Oil Field Pumps; Reciprocating Positive Displacement
	841360	Oil Well And Oil Field Pumps; Rotary Positive Displacement
	841382	Liquid Elevators
	841392	Parts of Liquid Elevators
	841960	Machinery For Liquefying Air Or Other Gases
	842129	Oil-Separation Equipment
	842139	Gas Separation Equipment
	842890	Oil And Gas Field Machinery For Lifting, Handling, Loading Or Unloading Machinery; NESOI
	843031	Coal Or Rock Cutters And Tunneling Machinery; Self-Propelled
	843039	Coal Or Rock Cutters And Tunneling Machinery; Other Than Self-Propelled
	843041	Boring Or Sinking Machinery; Self-Propelled
	843049	Boring Or Sinking Machinery; NESOI; Not Self-Propelled
	843139	Parts Suitable For Solely Or Principally With The Oil And Gas Field Machinery Of Other Lifting, Handling, Loading Or Unloading Machinery
	843143	Parts For Boring or Sinking Machinery; NESOI
	843149	Parts and Attachments NESOI for Derricks, ETC.
	847989	Oil And Gas Field Wire Line And Downhole Equipment
	870520	Mobile Drilling Derricks
	890120	Tankers for the Transport of Goods
	890520	Floating or Submersible Drilling or Production Platform
	890590	Light Vessel; Fire Float; Floating Cranes/Docks ETC

*2016 HTS additions are in red

Appendix IV: Citations

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