Doing Business in the Oil & Gas Sector:

Opportunities for German companies

(december 2015)

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Oseberg Field Centre, Foto: Harald Pettersen, Statoil

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Eduardo Eugenio Gouvêa Vieira, President of Sistema FIRJAN - Federation of Industries of the State of Rio de Janeiro

Rio de Janeiro is a state of opportunities. We are the leading oil and gas producer in Brazil and we also have, within the state's boundaries, more than 80% of oil reserves and more than 60% of gas.

Therefore, Rio hosts the main market players operating in Brazil, with highest concentration of qualified workers of the country for oil, gas and shipbuilding.

Investments in research, development and innovation as well as partners who pursue cutting edge technology, as the German industry, are essential to better explore Brazil's oil potential, including pre-salt layer. To host companies from the world's fifth place for patent registration is a privilege and an opportunity to exchange knowledge and technology.

The synergy between Sistema FIRJAN - Federation of Industries of the State of Rio de Janeiro, and the German Chamber of Industry and Commerce in Brazil is a facilitator to attract German companies that are willing to enter or expand their operations in the Brazilian market. Especially during the current scenario, the moment is to join efforts to keep following the path of sustainable development.

Eduardo Eugenio Gouvêa Vieira

Gerhard Haase, President of the Global Cluster for Oil and Gas of the German-Brazilian Chamber of Industry and Commerce Rio de Janeiro & General Manager Wintershall do Brasil Serviços Ltda.

Gerhard Haase

Dear Colleagues of the oil and gas industry,

The growing necessity to work and think across borders is a typical attribute of the worldwide oil & gas industry. The 5th edition of this German AHK booklet Doing Business in the Oil & Gas Sector: Opportunities for German Companies is therefore written in English, our industry´s common language. In addition, we have included for the first time eight features originating from our partners in this Global Cluster, highlighting the country specific oil & gas activities and challenges in Brazil, Iran, Mexico, Norway, Russia, Saudi Arabia, the United Arab Emirates and the US.

Over the last year, a number of negative headlines about the political and economic situation of Brazil caught the world´s attention. At the same time, the oil & gas industry had to adapt rapidly to the substantial decline of oil prices, the resulting budget reductions and a substantial rise of the US$ and Euro against the local currency. Especially Petrobras, the operator of Pre Salt projects and owner of the largest oil reserves in Brazil is still under close observation of its conduct related to consequences of the "Car Wash" corruption scandal. Several upstream developments were postponed, reduced in size or put on hold. Nevertheless, the majority of complex deep-water oil and gas field developments and installations continue being constructed and are put into operation, while tackling high technical challenges. Consequently, Brazil has risen to an internationally important oil producer since the discovery of the world's major offshore Pre-Salt hydrocarbons.

In order to achieve its adjusted oil and gas production growth target, which shifted the 4 million bpd more realistically from 2018 to 2020, Petrobras requires further 20 FPSOs, currently under construction (15), tendered (2) or to be contracted (3) to be operational by 2020. Also, international oil companies like Shell (and its take-over target BG), Statoil, Chevron and Repsol are maintaining their collaboration with Petrobras, or developing, in close cooperation with other third parties, their respective oil and gas field developments.

So far, only few German companies of the oil and gas or shipbuilding sector are active in Brazil. Many attractive investments still exist in this market segment, especially for companies with niche technologies, demonstrable energy efficiencies and, especially, with long-term vision for this largest South American economy. The German-Brazilian Chamber of Industry and Commerce continues its building of a Competence Center for supporting bilateral cooperation. Through its local connections and with regular events within the Global Cluster for Oil and Gas - a German Chambers Competence Center, industry representatives can make first contacts and reach out in an excellent atmosphere of communication.

The Brazilian energy market is clearly interested in a greater involvement of German companies - both in the onshore and offshore energy industry.

Introduction

The global oil & gas industry is facing changing conditions. Prices have temporarily fallen below 50 US$ a barrel. Consumption has only slightly risen, with renewables being the fastest growing source accounting for one-third of the increase in total primary energy use. Companies, for now, cut new investment in fossil fuel exploration. Access to new oil deposits is getting more expensive. Does this mean the approaching end of the oil & gas industry? On the contrary. Industry experts foresee a long lasting dependency on oil & gas and believe fossil fuels will continue to play the leading role in satisfying world energy needs in the future.

Strong demand impulse from Asia

Declining consumption in North America and Europe is more than outpaced by growth in Asia and other regions. Therefore, the likelihood that the world's consumption of gasoline, diesel fuel, jet fuel, heating oil, and other petroleum products will continue to grow is high. Newly industrializing countries will serve as a new motor. According to a recent forecast of Exxon Mobile, energy demand in Non-OECD-countries will grow up to 65% by 2040. As cars and trucks will notably get more energy efficient, aviation and shipping fuel demand is expected to grow. One consequence of the change from traditional consumption centers like USA, Europe, Japan and Korea to newly industrialized countries is an increase of oil and petrochemical derivatives transports. OPEC calculates a worldwide increase of around 21 million bpd in 2040. The International Energy Agency expects at least an additional 15 million bpd, with China replacing the USA as the biggest consumer in 2030, in the following period surpassed by India, Southeast Asia, the Middle East and sub-Saharan Africa.

Offshore and unconventional exploration boosts production

Concerning production increase, the most significant development of recent years was the shale revolution in the USA, replacing Saudi Arabia as the world`s largest oil producer. The drastic price drop since May 2015 stopped the shale boom for now, but experts expect a continuation of the success story, specially with falling exploration costs. According to the Energy Information Agency (EIA), even bigger shale gas sources are located in China and Argentina. The Vaca Muerta reservoir in the southern Argentinian province of Neuquen, for example, holds more than half of the volume of the actual US reserves. Even with more difficult conditions for shale gas, EIA expects U.S. crude oil production to increase by 8.1% in 2015 when 13 new fields in the Gulf of Mexico are due to come on stream by 2016. Other non-OPEC countries, such as Russia, Turkmenistan, Kazakhstan and Azerbaijan also raised their output considerably, exceeding home demand and developing additional infrastructure capable of boosting exports of both oil and gas further. Despite declining prices, OPEC decided at the end of 2014 not to reduce production in order to avoid losing market share to the US and will continue this policy, unless an unlikely deal between OPEC and big non-OPEC countries like Russia is struck. Caspian oil and gas exports are on the rise. In the second and third quarter oil production was also higher than expected in the North Sea, China, Asia, Latin America and Oman. Natural Gas is expected to grow globally at the fastest pace, although there are still policy and infrastructure issues to be resolved to turn it competitive in important markets.

New deposits less accessible

Latin America holds approximately 20% of the world's crude oil reserves, but produces only 12.5% of the global output. New deposits are more difficult to access such as, for example, deep-sea deposits like Brazil's Pre Salt or unconventional deposits like Venezuela´s Orinoco belt. According to markets experts, Latin governments still have to create the right kind of business climate for increase participation of the private sector. Brazil, as one of the most active countries in Latin America, is for now shaken up by the corruption scandal involving oil firm Petrobras. Recent auctions of new blocks in Brazil and Mexico have not been evaluated as very successful. Almost 30% of global oil and gas discoveries made over the last five years have been in sub-Saharan Africa, reflecting growing global appetite for African resources. The biggest deposits are in Nigeria, but due to uncertainties militant activity and oil theft, investment could be diverted to oil rich Angola. The actual increase of production in North Sea deposits is a result of investment decisions taken several years ago, whereas new investment is scarce.

Increasing need for technology

In summary, conditions for doing business in the global oil and gas industry have not become easier and 2016 will likely be another year of reduced investment and low prices. Nevertheless, the sector will undoubtedly remain an important on and, in the long run, continue to offer interesting opportunities due to the fact that additional, increasingly sophisticated-, technology is needed to increase efficiency, reduce costs and gain access to unconventional new deposits. This need could create an interesting playground for German suppliers. German engineering competencies could perfectly match Brazilian manufacturing capacities, creating a win-to-win business environment, where technological gaps, logistic barriers and Local Content matters are potentially solved together. In order to exchange experience, provide first-hand information and facilitate market entry of the companies, selected German Chambers of Commerce and Industry in key oil & gas markets are joining forces in the German Cluster for Oil & Gas. For contact see page in the end of this publication.

Vessel platform FPSO Cidade de Angra dos Reis . Photo: Geraldo Falcão

Top Oil & Gas-Producers

Country	Production 2014 (in 1.000 bpd)	Variation of Production 14/13 (in %)	Proven Oil Reserves 2014 (in billion barrels)
USA	11.644	15.9	48.5
Saudi Arabia	11.505	0.9	267.0
Russia	10.838	0.6	103.2
Canada	4.292	7.9	172.9
China	4.246	0.7	18.5
UAE	3.712	0.9	97.8
Iran	3.614	2.0	157.8
Iraq	3.285	4.6	150.0
Kuwait	3.123	-0.5	101.5
Mexico	2.784	-3.3	11.1
Venezuela	2.719	1.1	298.3
Brazil	2.346	11.2	16.2

Source: BP

Brazil

Brazil as a business location

After several years of promising growth, Brazil recently entered a more trouble both economically and politically. GDP is expected to fall by at least 3% in 2015, and the economy may take some time to recover, especially since the government has exhausted all the available short-term remedies and must now fix the country's structural problems, including infrastructure, education, corruption and bureaucracy. Yet, considering the size of the market, the still low per capita consumption and its vast array of natural resources, Brazil will continue to offer interesting business opportunities. Since Brazil has often in the past experienced such fluctuations of positive growth followed by more challenging periods, German companies have traditionally taken a long-term approach to this market and never stopped believing in business opportunities in Brazil. Brazil accounts for more than half of German exports to South America and more German FDI than Argentina, Mexico and Chile combined. About 1,400 German companies are active in Brazil, some of them for more than 100 years. These companies contribute with more than 10% of Brazil`s industrial GDP. About 250 new German companies have entered the market since 2012.

Oil & Gas industry in Brazil

With the Pre Salt deposit, Brazil calls its own the largest newly found sources of oil in the deep sea. According to estimations of the National Institute for Oil & Gas of the Universidade Estadual do Rio de Janeiro (UERJ), Pre Salt contains up to 176 billion barrels of oil and gas. The semi-public oil company Petrobras (state owned), is the dominant player in the business and, because the Pre Salt oil is located under 2 km thick layer of salt, a technological pioneer in deep sea drilling. Despite difficult in accessing, Pre Salt is already a reality, and its production surpassed 800.000 barrels per day in mid-2015. Expansion plans are very ambitious and originally included the construction of 88 cargo ships, 198 PSVs, 38 production units, 48 drill ships and four refineries with petrochemical plants. However the project suffered a considerable setback because of the corruption scandal "Lava Jato", which allegedly involved prominent politicians, Petrobras upper management and most of the big Brazilian construction companies and main contractors. Another challenge is the tight fiscal situation of the government, which has to follow a strict saving policy. This also affects oil & gas financing through the national development bank BNDES. With the additional drop of oil prices, the enthusiasm for Brazil as the new Eldorado of the global oil Industry dimmed somewhat, giving way to a more careful evaluation of the scope of the business opportunities. However, despite the challenges, most experts believe that Brazil will remain an important oil source based on its large oil deposit, domination of related technologies and generally stable environment. The first auction of the Pre Salt Oil went to a consortium of Petrobras, Total, Shell, CNOOC and CNPC in 2013. Libra holds up to 8 to 12 billion barrels and will require up to 100 billion US$. After a period of test drilling, a production pilot project is scheduled for 2020.

Arrival of the vessel platform FPSO Cidade de Angra dos Reis at the Tupi field in the Santos Basin. Photo: Geraldo Falcão

Business opportunities for German companies

The major buyer of equipment and services stays Petrobras, although spending in the future will be somewhat less enthusiastic due to public budget constraints. Petrobras revised its investment plans to cut 221 billion US$ (2014-18) to 140 billion US$ (2015-19). Additional cuts are likely. The focus of the remaining investment is on production in the Pre Salt area, while exploration of new blocks and the downstream infrastructure shift to second row a bit. The production targets were also revised. Originally, Petrobras wanted to reach 4.2 million bpd by 2020. The new target is 2.8 million bpd. However Petrobras also wants to guarantee future supply and, in doing so, turn Brazil into the desired net exporter, while at the same time lowering cost for the difficult production of ultra-deep sea pre salt deposits. To do this, Petrobras depends on collaboration with innovative high tech suppliers and partners. Recent, although still unsuccessful, attempts of government members to question the ambitious local content rules, could lead to the opening up of the industry, which has been slowed down by political and developmental goals. Specialists view following areas as promising: Subsea production (including electricity, processing of C02, interaction with flexible risers, scaling control etc.), shipbuilding (platform supply vessels, tankers, drill ships, production units; the Libra field alone will need up to 12-18 Production platforms and 60-90 PSVs), consulting for environmental impacts, cost reduction and efficiency improvement. Procurement channels are the e-portal Petronect, direct purchases by technical departments or through EPC contractors.

Success stories

German companies might not be among the major suppliers of Brazil's oil & gas industry, yet there are several examples of high demand and success for German technology. German technology and know-how clearly make a difference in the field of pumps, valves and pipes. For instance: Schulz from Krefeld produces stainless pipes and fittings for the Suape refinery; Butting manufactured bimetallic risers for liquid transport from sea ground to plataform in risers, as well as pipe systems and pressure vessels for the fire extinction systems on production units; Leser from Hamburg supplied safety valves for Pipelines, Platforms and Production units; Prominent sold dosing pumps and systems for high pressures appliances and sea water filtration; Lewa provided dosing pumps and systems used for, among other things, liquid separation on platforms; Protego from Braunschweig supplied pressure and vacuum relief valves with Flame Arresters; MAN Diesel & Turbo is a key supplier of gas turbines and gas compression centrals on Brazilian platforms; Zeppelin build the hulls of several crew boats for Petrobras; Flensburger Schiffbau-Gesellschaft is building two well intervention vessels for the pre salt area.

The newest success story comes from liquid storage expert Oiltanking, who bought a 20% stake in Brazil's most promising new commodity export port, Porto de Açu, in northern Rio de Janeiro state. The future liquids terminal will have a capacity of 1.2 million bpd and will graetl facilitate Brazil´s future oil and derivatives exports through a ship-to-ship-logistics system. "Our goal in Porto de Açu is it to offer safer and more efficient transboarding operations," says Holger Donath, General Director for Latin America.

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Ship-platform FPSO Cidade de São Paulo in Sapinhoá field in the Santos Basin. Photo: Andre Motta de Souza

Mexico

Mexico as a business destination

Mexico as a business destination stands out due to its political and economic stability. Between 2010 and 2014 the country grew on average 3.3 % per year and benefited from low inflation rates. In the past years the country evolved into a competitive contract processing location for exports to the United States which at the same time is its most important trading partner. Aside from a duty-free access to the US and Canada (North-American Free Trade Agreement NAFTA), Mexico has a wide network of free trade agreements with 45 countries and is member of the OECD. Furthermore, Mexico possesses a geostrategic position between North and South America and offers a large and strong domestic market including a growing number of German enterprises (1.700 companies with 150.000 employees).

Mexico is heavily dependent on petroleum, as the petroleum sector comprises approximately one-third of the country's revenues. After oil prices fell by about 60 % since June 2014, the government consequently had to adapt its budgets. Nevertheless, Mexico plays an important role in the global oil and gas market. The country is a major non-OPEC oil producer and is also a major source for US oil imports. Having produced 2.8 million barrels of petroleum in 2014, Mexico ranks 10th when compared on an international level. With 2.3 trillion cubic feet (ca. 65.8 billion m^3) of natural gas in 2013, the country ranks 13th in terms of production.

Pemex platform "Ku Maloob Zaap" in the Bay of Campeche, Gulf of Mexico, Photo: Reuters.

Tugboats, Photo: Pemex

The Mexican petroleum sector and its need for change

State-owned enterprise Petróleos Mexicanos (Pemex) was founded as consequence of the nationalization of the oil and gas sector in 1938. It was the only operating firm in exploration, extraction and processing of hydrocarbons for more than half a century. Although levels of investment in the sector have increased, crude oil production has decreased by a million barrels per day in the past eight years. Since Pemex is unable to satisfy the increasing demand for gasoline and diesel in Mexico, it has to import almost half of its national consumption from the United States. In addition, it has to import 65% of its petrochemical and 33% of its natural gas consumption.

The energy reform - facts

Because Pemex had neither sufficient funding nor technological know-how to trigger a trend reversal and increase output on the long term, a legal framework had to be created in order to attract investment and professional knowledge. In December 2013 reforms in the energy sector were signed into law. The reform's aim is to liberate the oil and gas sector by tendering fields in bidding processes and thereby in the long term enabling private investment in every stage of the value chain. Thus, it effectively ends the monopoly that was held for 75 years by Pemex. It is intended to transform the company into an efficient and productive major market player by restructuring and exposing it to competitors. The awarding of contracts for the exploration and production of hydrocarbons is conducted by bidding rounds (Ronda 0 - 5). The introduction of competition is carried out on a gradual and selective

basis. This is why the first bidding process, the so-called Ronda 0, was reserved only for Pemex. All the following bidding processes will also be open to private firms.

Beneath the surface, however, the Mexican state will remain owner of the hydrocarbons. To ensure an efficient organization of the bidding processes and the regulation of the energy sector, public institutions were created, while others gained more competences. The institutions and their respective functions in the regulatory framework are listed in the following table:

Table 1: Regulators and their function in the Mexican hydrocarbon market

Regulator	Function
National Hydrocarbons Commission (CNH)	Regulates upstream activities and determines winners of upstream bids
Energy Regulatory Commission (CRE)	Regulates electricity as well as mid- and downstream for hydrocarbons
Agency for Safety, Energy and Environment (ASEA)	Guarantees environmental protection and industrial security in the hydrocarbon sector

Exploration and production contracts for the respective oil deposits are awarded by the National Hydrocarbons Commission (CNH) together with the Ministry of Energy (SENER) and the Ministry of Finance and Public Credit (SHP). An important aspect of the reform is the development of the national supplier industry. To improve the development of the national supplier industry, the reform determines guidelines of local content in the exploration and production phase. While the local content of exploration varies depending on the field, production has to prove a local content of 25% in 2015. This amount will be increased gradually up to 35% by 2025.

In the initial auction of the Ronda 1, nine companies participated and altogether 14 shallow-water blocks in the southern Gulf of Mexico were put out for tender. Government officials had expected a success rate of 30% but were disappointed because only two blocks were awarded. Mainly two factors determined the winner: the highest amount of operating profit to be shared with the government and the amount of investment. Beside continuing issues such as very low oil prices and, in part, the contract conditions, the drawback of Pemex and other important bidders from the Ronda 1 created an atmosphere of uncertainty before the auction. Although expectations were not fulfilled, the international public praised the process for its transparency. The blocks that could not be awarded this time will be included in following bid rounds.

The second phase of the first bidding round, which began at the end of February 2015, will end on September 30th. Five shallow water blocks are tendered for production. According to the latest findings, the government has been adapting the contracts and, in doing so, increasing the flexibility of conditions in order to attract more investors and improve the efficiency of the bidding processes. One of the changes allows companies to bid individually for some fields and in a consortium for other fields. Conditions on financial guarantees were lightened. As a result, companies are no longer required to have 6 billion US$ in equity available. They may alternatively provide a guarantee equaling 18 times the minimum investment requirement set by the government. This provides more incentives to smaller companies to participate in the bidding. If companies find more oil than expected or if oil prices rise, they will now be able to keep more of their profits.

Business Opportunities for German companies

German companies can enter the Mexican oil and gas market, for example, by participating in the bidding process for exploration and production areas. According to the National Hydrocarbon Law, the CNH awards four different types of contracts to foreign and domestic companies: 1) license contracts 2) production-sharing 3) profit-sharing contracts and 4) service contracts.

Companies can tender on their own initiative or in a consortium. The latter is recommended for German firms that do not have experience in the market. Suitable entry strategies could be the establishment of joint ventures, either with Mexican technology or service sector companies or with international companies providing services to Pemex. Furthermore, it is possible to operate/provide services through a larger service sector company that already has established customer relationships in the market. Another option could be the creation of a German consortium of technical expertise that offers a wide range of services to prospective clients.

However, entering the Mexican hydrocarbon market can also be accomplished by doing business directly with Pemex. The company is able to contract and/or subcontract third parties by means of standard remunerated integrated service agreements or other standard forms. Also, it manages farm-out agreements. These allow another company to take a stake in

Table 2: Contract types awarded by the National Hydrocarbon Commission

License contracts	Production-sharing contracts
• Extracted resources are owned by the company • Additional payments in favor of the nation: Signing bonus, exploratory phase fee, royalties, payment that consists of a percentage of the contract value of hydrocarbons produced	• Extracted resources are owned by the company • Additional payments in favor of the nation: Exploratory phase fees, royalties, payment that consists of a percentage of production
Profit-sharing contracts	**Service contracts**
• Extracted resources are owned by the company • Additional payments in favor of the nation: Exploratory phase fees, royalties, payment that consists of a percentage of operating profits	• All production will be delivered to the state • Payment to the contractor is made by the Mexican Oil Fund

its exploration or production projects in exchange for taking on capital expenditure and exploration costs. Furthermore, it is possible to apply together with Pemex for public tenders. Regardless of whether the contracting authority is Pemex or the Mexican state, it is recommended to register in Pemex's supplier evaluation system (Sistema de Registro de Evaluación de Proveedores).

In the following areas there is a high demand for German technology and services.

Table 3: Areas of opportunity for service and equipment companies

Seismic	Tubing
• Seismic, micro-seismic imaging • Seismic data processing and analysis	• Production tubing and casing
Drilling	**Logistics**
• Hydraulic fracking and horizontal drilling • Rig manufacturing and rig site products • Progressive cavity pump system • Production optimization equipment • Flow control products • Offshore drilling	• Supply and transportation of proppants (sand and ceramics) • Helicopters • Technologies for inspection, monitoring and management of physical infrastructure • Platform supply vessels and other marine services
Service to wells	**Other**
• Oil and gas software (data management) • Oil and gas processing and well testing equipment	• Shale services • Deepwater services • Capital equipment

The Mexican Energy Reform has a lot of potential to substantially change the hydrocarbon sector in the long term. The need for foreign technology, know-how and capital is enormous and its inflow will bring progress and increased productivity. This is why many business opportunities will be generated in every stage of the value chain. German companies that consider investing at this point in the Mexican hydrocarbon sector will be able to implement their technology, products and services from the beginning and will gain competitive advantage. The high quality benchmarks of their products will help establish a strong and profitable market position in the long term.

Best Practice – Züblin Ambiental

Best Practice:

"Inspire confidence and be patient"

Rubén Mendoza, CEO
Züblin Ambiental

Products	Environmental engineering services, remediation of contaminated soils and water treatment
Züblin Ambiental in Mexico	In 2001 we entered the market by founding the subsidiary Züblin Ambiental of Züblin Umwelttechnik from Stuttgart, Germany, in Mexico City. Since 2006 we have been working with the national oil company Petróleos Mexicanos (Pemex) directly or with subcontracts.
Market attractiveness	In the past years the awareness of environmental protection has become an increasingly important topic in the Mexican petroleum industry and the legal basis has also been extended. At the same time the implementation of control mechanisms has gradually improved. The Mexican energy reform will further ameliorate this business environment. It will liberate the national petroleum sector of the isolation that impeded progress and create business opportunities in various areas.
Challenges	Within the Mexican culture, the development of projects and the signing of business deals is very time-consuming. In this sense, it is important to be patient and invest time to have business deals signed. Concerning environmental engineering, it is crucial to raise awareness and inspire confidence towards your products, services and technology.
Advices for newcomers	According to our experience, German firms should study the market and potential of doing business in detail before entering the market. Furthermore, I recommend considering that it will take time to become familiar with the Mexican way of doing business. This includes being patient when it comes to time-consuming decisions in a business context.

System Stabilization/Solidification of soft soils. Stock photo AHK Mexiko

Züblin Ambiental was founded in 2001 as a subsidiary of its German parent company Züblin Umwelttechnik GmbH from Stuttgart. The company has developed a wide range of projects in many areas, such as mining, energy, infrastructure, public works and construction in general. It focuses on offering new technologies, technical support and maintenance, provided by its parent company in Germany. Furthermore, Züblin Ambiental constantly renovates equipment and technology resources. Its innovative competences and technology, combined with a solid financial base, ensure a strong market position on a national and international level.

In the Mexican market they have managed projects directly or indirectly with Pemex. Regarding the hydrocarbon sector, their projects mainly deal with environmental remediation of contaminated soils. In order to do this they implement technologies like soil vapor extraction, bioremediation and catalytic oxidation. These technologies have been deployed for example in Campeche, San Luis Potosí, Salina Cruz, Veracruz and Mérida.

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Water Treatment Plant / Desorption system. Stock photo AHK Mexiko

Norway

The present situation

The sharp decline in the price of oil in recent months combined with a high level of costs is presenting somewhat of a challenge to the Norwegian offshore oil and gas industry. Yet, in terms of value creation, export volume, investments and government revenue, this sector will nevertheless remain the largest in the country in the coming decades. One indication for continuing high levels of activity are the development and the opening up for development of extensive crude oil reserves, most notably the Johan Sverdrup field in the North Sea. At a break-even price of around 41 US$ this field remains viable even at the currently low oil price.

In order to maintain profitability also in the long term, the focus will in future be increasingly on improving efficiency, lowering costs and strengthening co-operation between industry players. The decline in the price of oil is creating an opportunity for further development of high-tech solutions and the deployment of integrated measures.

A dedicated, competent supplier industry is characteristic of this industry sector and offers sound prerequisites for international business, both for this sector as well as other industries such as the maritime industry.

Economic structure

Norway is the second largest net exporter of natural gas and the fifth largest exporter of petroleum worldwide. A cluster of companies has developed in relation to the natural gas and oil reserves in Norway, specializing in providing goods and services to this sector, especially in the areas of modern technology, transport, seismic surveys, engineering, testing and analysis contracts, as well as in maintenance and safety.

Revenue from the oil and gas sector contributes significantly to offsetting economic fluctuations in Norway, government budget spending, as well as the low level of unemployment. Norway's economy thus enjoys a very high degree of planning security and economic stability. In order to strengthen the country's competitiveness sustainably, the government under Prime Minister Erna Solberg has in 2015 decided to initiate important steps. Privatization is to be expedited, the network industry will be deregulated further, the taxation system will be simplified, and taxes will be reduced directly or increasingly shifted to environmentally harmful activities.

Export of Oil & Gas

The total export value of oil and gas in 2014 was at around EUR 60.6 billion. Nearly 46 percent of Norway's export revenue originates on the Norwegian continental shelf. Around 70 million standard cubic meters of oil equivalent are exported directly, 80 percent of which to other European countries.

In addition, Norway's natural gas production has grown significantly in recent years. Almost all Norwegian gas was sold on the European market. A well-developed and effective infrastructure as well as a reasonable transport distance make Norwegian gas competitive. The majority is exported to Germany, Great Britain, Belgium and France where Norwegian gas accounts for between 20% and 40% of total consumption.

Aside from natural gas and petroleum, Norway also exports a significant amount of goods and services used in the oil and gas industry worldwide.

Sleipner A platform storm, Photo: Øyvind Hagen, Statoil

Businesses active in the industry

The government plays a significant role in the Norwegian economy – numerous major economic operators are publicly owned. The oil and gas producer Statoil is one of the most important of these public companies and is, in terms of production volume, also the largest company on the Norwegian continental shelf. The Norwegian government owns 67 percent of Statoil, making it the corporation's largest shareholder. Other major companies on the Norwegian continental shelf are Exxon-Mobil, Total, Shell, ConocoPhillips and ENI. Economic operators based in Germany who are active on the Norwegian shelf include Wintershall, VNG, Bayerngas, E.ON and DEA. In total almost 50 companies large and small are active in the oil and gas industry on the Norwegian continental shelf in the areas of exploration, production and infrastructure. Corporate activity in the oil industry has been rising steadily in recent years due to higher energy prices, opening up of new oil and gas reserves, and a demand for the modernization of older offshore fields.

Planned investment projects and potential

Estimates by the Norwegian Petroleum Directorate suggest that in total around 37% of the remaining resources on Norwegian soil have not yet been discovered. At present, 77 offshore production fields are in operation – the North Sea with its 60 fields is considered to be the driver of the Norwegian shelf. Located in the European North Sea are 16 fields; one more is in the Barents Sea. The largest reservoirs at the moment are the Johan Sverdrup field in the North Sea and the Johan Castberg field in the Barents Sea. These will account for over a quarter of Norwegian oil production after their full development.

The average recovery rate of all fields on the Norwegian continental shelf has risen from 40% in 1995 to 46% in 2014. It is expected that the recovery rate will continue to increase in the coming years. The development and use of new technologies is a deciding factor in achieving this objective. The demand for technologies that increase recovery levels will therefore rise significantly in the future. Operating costs on Norwegian soil are partly higher than in other comparable petroleum extraction regions. Based on current estimates by the operators, the Norwegian Office for Statistics (SSB) expects that some exploration activities will be postponed due to weak developments in the oil price, which will lead to a decline in exploration activities in 2016. In addition, the majority of operating contracts for oil platforms on the Norwegian continental shelf is due to expire in 2015-2017. In order to meet the requirement by petroleum companies to decrease costs and increase efficiency, most platform owners will also be looking to hire foreign operators.

Troll B platform, Photo: Øyvind Hagen, Statoil

Regardless of the progression of the oil price, the full development of the Johan Sverdrup field will fire up the investment value of the Norwegian petroleum industry in the short to medium term. This field has reserves of between 1.7 and 3.0 billion barrels of petroleum equivalent and an estimated lifespan of 50 years. A production rate of 70% is sought, under the assumption that the development of new technologies may contribute to an increased recovery rate at a later stage. Investments in the initial development stage are at EUR 11-13 billion. This includes all installations for a field center, well, transportation of oil and gas, as well as electricity supply from the mainland. Phase Two is set to commence in 2022 and estimated to reach a total investment volume between EUR 18.5-24.3 billion.

Market entry potential for German companies

Companies based in the EU play a fundamental role as suppliers of goods and services to the Norwegian oil and gas industry. Products and services are either delivered directly by the manufacturing plant from the country of origin or by a Norwegian subsidiary. Many manufacturers of components or equipment also work in cooperation with trade representatives or agencies who interact on their behalf with Norwegian systems suppliers or other clients, and who are also responsible for quality assurance and documentation. This approach is common for equipment supplied from abroad, such as generators and compressors among others. In some cases, the foreign manufacturer operates a subsidiary in Norway with its own services department.

In the current economic phase marked by high cost pressures and falling oil prices, the transition from customized solutions to a one-size-fits-all solution is seen as a positive step by the industry to counteract a lack of efficiency. In addition, most recent developments in the oil price market have resulted in Norwegian supplier companies restructuring their human resources and technological capacities, as well as repositioning their cooperations within industry segments and with their customers, in order to be able to offer new and better integrated services and technologies. These are to contribute to better cost efficiency in future energy production.

It is worth noting that the Statoil Technical Efficiency Programme (STEP), published by Statoil in 2014, includes six sub-projects: integrated shipping services (end-to-end well delivery), intensified early stages, standardization and industrialization, high performance services for OMM (operations, maintenance & modifications), supplier management and efficiency, simplification and resource prioritisation.

Challenges and trends

Future challenges facing offshore production are essentially remote production areas, deep-water channels, rough and unpredictable environmental conditions, thicker and more viscous oil varieties, as well as obtaining greater yield from existing offshore oil fields. New technologies addressing these issues are therefore particularly in demand. Underwater technology, for example, will thus play a greater role in the coming years, also in view of potential raw materials extraction in the Artic. In addition, energy-efficient, environmentally-friendly and sustainable solutions for oil and gas recovery are just as much a priority as cost-effective drilling and well intervention. As a result, demand for future-oriented technology in production, processing and transport is rising steadily. High levels of interest continue to be expected in the areas of automation, digitalization and Integrated Operations. If Norway is to remain competitive at higher reasonable costs, primarily due to high wage levels, the challenge will be to achieve a higher level of productivity than the competition. This Norwegian industry sector has therefore always been particularly receptive to testing new technology and putting it into use.

The major operating companies would like to reduce the number of offshore workers and control the installations as far as possible from the mainland. Information and communications technology is set to change the oil and gas recovery processes as well as associated accompanying measures. The current expansion of the worldwide largest 4G network at sea for Statoil is creating good prerequisites for the future use of Integrated Operations. This will also lead to a much closer cooperation between suppliers and operators through the development of new equipment and by changing work processes among other things.

In order to qualify as a supplier, and to be visible to the buyers of major operators, registration in the suppliers' register Achilles is recommended as well as maintaining direct contact with oil companies and EPC contractors. Since the Norwegian continental shelf is exempted from the Norwegian regulatory framework for public tenders, no public tendering portals exist on which current projects are presented. This is yet another reason why maintaining a network in Norway is of central importance.

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United States

Economic overview

In the years since the major global recession in 2009, the U.S. economy has experienced a significant recovery, maintaining its position as the largest economy in the world with a 2014 GDP of 17.4 trillion US$.[1] The U.S. population grows every year while unemployment is forecasted to decrease to 5.2% in 2016.[2] Also, the U.S. has the strongest investment climate worldwide[3], leading the A.T. Kearney Foreign Direct Investment Confidence Index for the past three years with a positive outlook in the future. The UN estimated that in 2014 one-eighth of all global foreign direct investments were made in the U.S., demonstrating sustained investor confidence in the strength of its ongoing economic recovery.

The biggest advantages of the country are:

- The overall market size of the U.S. itself in addition to easy access to the Canadian and Mexican markets via the NAFTA trade agreement, as well as trade agreements with 18 other countries.
- Linkage and collaborations between universities, research institutions and private businesses.
- Economic freedom, labor market flexibility and pro-business environment of governmental and legal authorities.
- Advanced role in determining the Transpacific Partnership (TTP). Thereafter, the U.S. can be used as a platform to serve Asian markets.
- Last but not least, the importance of the domestic oil and gas boom.

Ultimately, the U.S. remains the largest, non-conglomerate market with excellent prospects for the near future as a primary driver of global economic growth along with China and the EU.

Oil & Gas industry

The U.S. has been a pioneer in oil drilling and refining, which has encouraged the development and settlement of energy-related industries for decades. Many companies are engaged in domestic oil and gas processing industries, enabling them to meet the petroleum industry's needs and maintaining advantages against international competitors.

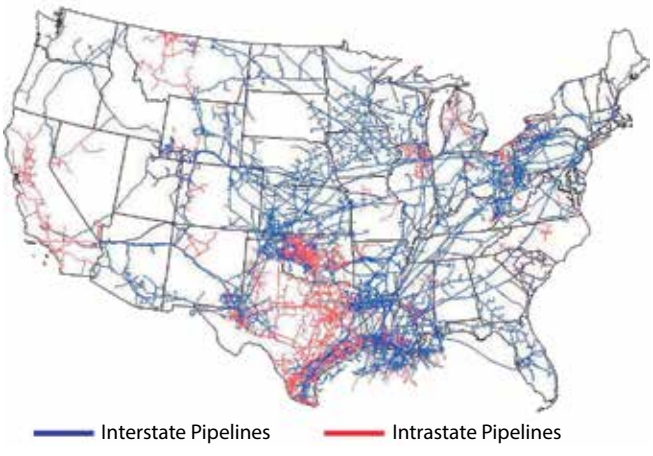
Due to technical innovations since 2012, the U.S. production has increased the extraction of shale oil and gas, thereby decreasing the country's dependence on imports. In 2013 the U.S. became for the first time the world's biggest oil producer after overtaking Saudi Arabia and Russia with 12.3 million barrels per day (bpd). This trend continued in 2014 with an increase to 13.9 million bpd, which exceeds Saudi Arabia's production by approx. 17%. Moreover, the U.S. became the world's largest natural gas producer in 2010.

Proven reserves of crude oil have also been expanding over the past five years, reaching 36 billion barrels in 2013. Forecasts predict a continuation of this upwards trend.

Gulf coast significance

The U.S. government pursues the expansion of the offshore sector as a high priority. The focus of new field exploitation focuses especially on the Gulf Coast where the country's oil and gas industry finds its main cluster.

U.S. Natural Gas Pipeline Network, 2009



Source: Energy Information Administration, Office Oil & Gas, Natural Gas Division, Gas Transportation Information System

The above illustration by the U.S. Energy Information Administration (EIA) shows the accumulation of pipelines along the

[1] World Bank 2014
[2] International Monetary Fund: World Economic Outlook Database, April 2015
[3] 2015's publication of the *A.T. Kearney Foreign Direct Investment Confidence Index*

Gulf Coast. The state of Texas contains the most extensive network of intrastate gas pipelines.

Crude oil is produced in 31 U.S. states and in U.S. coastal waters. In 2014, about 16% of U.S. crude oil was produced from wells located offshore in the waters of the Gulf of Mexico. About 65% of U.S. crude oil production came from five states:

- Texas (37%)
- North Dakota (13%)
- California (6%)
- Alaska (6%)
- Oklahoma (4%)

Project Activity - Forecast 2015

Industry	Number of Projects	Expected Expenditures (billion US$)
Oil & Gas Production	354	166.2
Oil & Gas Transmission	154	10.2
Terminals	168	5.4
Petroleum Refining	259	8.9
Chemical Processing	999	59.4
Total	**1934**	**250.1**

The southern U.S. also has the highest numbers of planned investments for project activity. The table below lists the expected project expenditures for the states of Texas, Louisiana, Mississippi, Alabama, Georgia and Florida:

Nearly all the big global players in the energy markets have locations in this area and contribute to these high investment numbers (EXXON Mobil, Royal Dutch Shell, Chevron, Total, ConocoPhilips, Valero).

Another boost for the region will be triggered by the completion of the Panama Canal expansion (project name "Third Set of Locks"). This is expected to be completed in April 2016. The wider canal will allow the passage for larger ships who otherwise would route around South America to reach the Gulf Coast ports. In the future, vessels will be much larger and able to carry approx. twice as much cargo compared to today's situation. This will enhance the leading role of U.S. Gulf Coast's ports in terms of annual tonnage and will drive the region's logistics and trade industries.

Projects and investments

Gulf coast industrial projects

As it has for the past few years, the U.S. Southwest region once again outperforms the rest of the nation in its total investment value for projects expected to begin construction in the last quarter of 2015. The region anticipates more than $23 billion in project kickoffs, a number that is heavily influenced by the rapid growth of the energy industry along the Gulf Coast. More than half of the total value can be found in four industries: Alternative Fuels, Oil & Gas, Power, and Metals & Minerals.

Project spending in the U.S. Gulf Coast region is forecast to peak in 2017 at an estimated 64.1 billion US$.

Pipelines

The construction of pipelines has also underpinned industry revenue growth over the past years since new pipeline construction relies heavily on valves and related parts. Ongoing maintenance and repair of existing piping systems has further supported revenue. This is particularly true for the private sector where maintaining existing systems has become the primary focus.

Construction of energy pipelines across the U.S. is currently at a peak high of 72 active U.S. oil and gas pipeline projects worth nearly 7.4 billion US$, which are scheduled to start in the last quarter of 2015. It is uncertain if all projects will proceed if low oil prices persist. With projects worth a combined 1.7 billion US$, North Dakota is the top state for pipeline kickoffs in terms of value, followed by Texas with 1.6 billion US$ and Kansas with 890 million US$.[4]

Maersk Developer in the Gulf of México, Photo: Jonathan Bachmann, Statoil

[4] http://www.industrialinfo.com/

Refineries and terminals

The U.S. could see construction starts for as many as 51 refining-related projects in the 4th quarter of 2015 with combined investments of 1.21 billion US$. Twenty of the active projects involve refinery turnarounds. Texas is the top state for refining-related projects with 533 million US$ in terms of value.

63 active U.S. terminal-related projects worth 2.88 billion US$ that are expected to take off within the final months of 2015. This includes 16 grassroots projects. Texas could see more than 1.9 billion US$ in kickoffs in the upcoming quarter, followed by California with 276 million US$ and Louisiana with 234 million US$.[5]

Opportunities for German companies

Since July 2014 the industry is struggling with the heavy drop in oil prices. Shale oil projects in particular are negatively impacted by operating in the red due to their higher operating costs as compared with conventional oil extraction. This forces many companies to set a new focus on efficiency, reducing overcapacities and applying stricter criteria when choosing exploration areas.

This development has led to harmful consequences such as a high number of lay-offs or holds on investment projects. On the other hand, it boosts advantages for all oil consuming industries, such as chemical and petrochemical. Furthermore, the paradigm shift among oil producers delivers market entry chances and new opportunities for supplier companies capable of meeting the new needs of companies struggling with low oil prices.

Now project decisions tend to be made more based on long term benefits rather than the quick increase of plain oil production. There is a shift from quantity- to quality-thinking. Operational excellence, efficiency and lean production receive more emphasis.

These changes provide opportunities for German companies offering high-quality specialized solutions that offer pay offs over the long run. Products and services that promise improvements in operational costs receive more attention and consideration. The stamp "made in Germany" enjoys a good reputation in the U.S., positively associated with reliability, competitiveness and quality.

Furthermore, the Bureau of Ocean Energy Management (BOEM) works continuously to tighten their regulations in order to avoid a repetition of an oil disaster such as Deepwater Horizon. This is another reason why companies in the oil and gas industry choose solutions emphasizing safety and quality.

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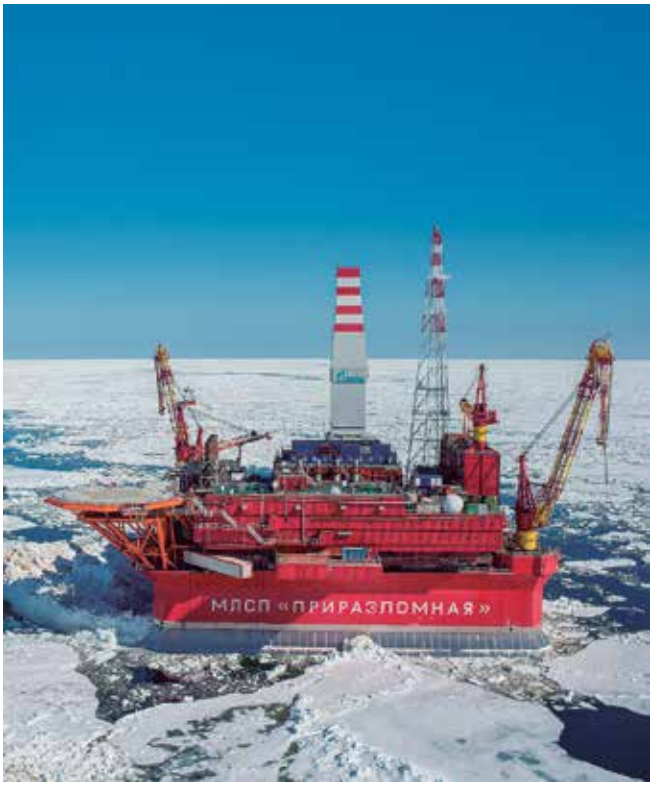
Bakken, North Dakota, Photo: Jørgen Bratland, Statoil

[5] IBISWorld, industrialinfo.com

Russia

Russia's economic position

The Russian economy is about to shrink 3.5 to 4.0% in 2015, and the recession is expected to continue next year. The oil's low price weakens the investment power of the State, as well as that of important banks and big energy companies. Conflicts in East Ukraine have flared up again, making the lifting of Western sanctions unlikely. There are no good signs of economic recovery in Russia. No strong driver of growth for the Russian economy is in sight. The European Bank for Reconstruction and Development (EBRD)'s prognosis for the economic situation in Russia is pessimistic: a loss of 4.5% is expected for 2015. In the second quarter, Russian economy's shrinking was visibly worse than in the first quarter. Investments and consumption have seen a violent collapse. The weak ruble and funding bottlenecks have made Russian importers constantly reduce their acquisition of foreign good. Several indicators like incoming orders, cargo volumes, retail sales, income development and consumer confidence point to a fall. The reframing of foreign trade with partner countries in Asia restricted by the sanctions is proving to be more difficult than previously expected.



Prirazlomnaja platform in the arctic shelf, Photo: Gazprom

Oil & Gas in Russia

In terms of both reserves and in production, Russia is one of the most important oil and gas producers in the world, but the low price on the international market as well as Western sanctions are pressing the country to acquire the necessary infrastructure and open new sales markets. Following the approximation with China, energy giants like Gazprom and Rosneft are investing billions of dollars in pipelines and NLG equipment in order to develop the Chinese market for Russian oil and gas. In the Yamal peninsula, in the North of Russia, Novatek and Total have joint oil exploration operations and export as LNG. China's state company CNPC has a share of 20% in this project. China's Import-Export Bank and China's Development Bank are expected to give 12 billion US$ in credit. Price negotiations with Turkey for building the "Turkish Stream" oil pipeline, which should cross the Black Sea to Anatolia and from there to Europe are seen as extremely difficult for Gazprom.

There is a huge demand in the oil and gas industry in Russia for offshore technology. Currently, the biggest demand is for offshore platforms, supply vessels and tankers.A significant part of the civil shipbuilding program serves the development of offshore deposits for oil and gas in the Northern shelf. Rosneft alone foresees the demand for the acquisition of 11 oil platforms and 88 supply vessels by 2027.

Russia still strongly depends on importing ship building technology and ready-made vessels. Around 90% of container vessels and supply vessels for oil and gas transport must be purchased overseas. The Government wants to change this scenario: the current plan is massive import substitution. In Russia, mainly drilling rigs and supply vessels are projected. Other special vessels, like the LNG tankers with polar-class icebreakers will still be imported.

The Russian government has commissioned energy concerns Rosneft, Lukoil, Gazprom and Novatek with the building of special vessels in shipyards in the East. The centerpiece is the "Swesda" (pronounced as Swoysda), which is currently in expansion. Companies investing capital include shipbuilder OSK, oil company Rosneft and Gazprom bank. For the expansion of the shipyard, the State gives 90 million rubles in subsi-

dies from the National Welfare Fund. Production is expected to start in 2016/17. According to Rosneft, 28 supply vessels and ready platforms should be built in Swesda. What is hindering implementation is the decreasing financial power of the oil company. On one hand, the current oil price does not allow any significant increase in expenses. With the drop of the oil price after the lifting of Iran sanctions, the threat is that Rosneft's acquisitions will continue to fall. On the other hand, there are still foreign liabilities in the billions to be cleared. In addition, Swesda needs to build technical competence in order to be able to build platforms with polar icebreaker capacity and supply vessels. An unrelated idea to launch LNG tankers from Swesda with Arctic operation capacity has been temporarily shelved. Nevertheless, the project is not totally sorted out. Daewoo Shipbuilding & Marine Engineering (DSME) from Korea, with is currently building tankers for the GNL project in the Russian peninsula of Yamal, has announced a possible transfer of part of the assembly work to the Far East of Russia starting in 2020. Before 2013, DSME was already flirting with a share in shipbuilding company Swesda.

Chances for German suppliers

For German ocean technology producers, it will be hard to receive orders from Russia. On March 31, 2015, Trade and Industry Minister Denis Manturow signed a list comprising 107 positions of goods in the shipbuilding and offshore industry. The production of these components should increase until 2020 and, consequently, importing will decrease. When there are no local manufacturers, priority is given first to suppliers from countries that have not agreed with Western sanctions. This list includes mainly shipbuilding countries in Asia, such as the South Korea and the Popular Republic of China. Only in the case that Russian buyers are unable to find what they need from these countries will imports from member-states of EU, Norway, the USA and Australia be considered. Western suppliers of shipbuilding technology, which are currently witnessing a decrease in imports could contemplate the installation of local assembly plants as a solution. Thus, according to Russian law, they would be converted into legal entities and would have access to public acquisition measures. For that matter, Trade and Industry Minister Denis Manturow summarizes his import substitution policy as follows: "Technology in exchange for market shares." Duly translated: Direct investments that result in technology and knowledge transfer will be rewarded with the access to public bidding and state-owned shipyards. Underpinned by the law, this is a promise for contracts that each potential investor in the segment can sign immediately with the Trade and Industry Ministry. The contracts determine the incentives the Ministry is committed to provide, according to the negotiation procedures and the status of the investments. This includes tax relief and certain subsidies. Conversely, investors must meet the implementation and localization deadlines.

The new policy of the Trade and Industry Ministry of giving incentives to encourage local production in Russia with "special investment contracts" individually negotiated, in which localization is measured not only as part of local added value, but also according to the (technological) competences negotiated, could be a step in the right direction.

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Gas pipes, Photo: Pixabay

United Arab Emirates

The UAE Oil market

The UAE has the world's seventh largest reserves of both oil and natural gas, estimated at 97.8 million barrels and 215 trillion cubic feet respectively. Most of the UAE' reserves are in Abu Dhabi (95% of the nation's oil reserves and about 94% of its gas reserves), both offshore and onshore. The UAE is the fourth largest net oil exporter: crude oil exports amounted to 2.9 million barrels per day (bpd) at the end of 2014, roughly 15% of OPEC's total oil output. A heavy program of investment in Abu Dhabi, amounting to more than 70 billion US$, continues as the Emirate's Supreme Petroleum Council (SPC) and the Abu Dhabi National Oil Company (ADNOC) seek to achieve a target of 3.5 million bpd by 2017.

Although sectors such as tourism, construction and real estate experience continued growth, the oil and gas industry remains a highly significant contributor to the UAE's gross domestic product. Despite the relatively low oil price, the UAE and the Middle East in general will maintain its status as a major center of global oil supply due to relatively low production costs in the region and proximity to expanding Asian economies. In order to cover the household expenditure, the UAE would need a 70 USD oil price. Despite being the most dependent Emirate on oil, Abu Dhabi also has the greatest financial cushion (GTAI, February 2015).

Each of the seven Emirates is responsible for regulating the oil industry within its borders, creating a mix of production-sharing arrangements and service contracts. In Abu Dhabi, the Supreme Petroleum Council (SPC), chaired by His Highness Sheikh Khalifa Bin Zayed Al-Nahyan, President of the UAE and Ruler of Abu Dhabi, sets Abu Dhabi's petroleum-related objectives and policies. Given Abu Dhabi's status as the central player in the UAE's oil industry, the SPC is the most important entity in the country when it comes to establishing oil policy. ADNOC - which operates 15 subsidiaries throughout the oil, natural gas, and petrochemical sector - leads the day-to-day operations and implementation of SPC directives, and it is the key shareholder in nearly all upstream activity in Abu Dhabi. ADNOC's subsidiaries engage in oil and natural gas exploration, processing, and distribution, among other activities. ADNOC was established in 1971 to operate in all areas of the oil and gas industry and since then has steadily broadened its activity by establishing companies and subsidiaries and creating an integrated oil and gas industry in the fields of exploration and production, support services, oil refining and gas processing, chemicals and petrochemicals, maritime transportation and refined products and distribution. ADNOC has 15 subsidiary companies working in the various fields of the oil, gas, and petrochemical industry, as well as crude oil and gas transport and services. They include ADCO, ADMA-OPCO, GASCO, ADGAS, ZADCO, TAKREER, NDC, ESNAAD, IRSHAD, FERTIL, BOROUGE, ADNATCO-NGSCO, ADNOC Distribution, Elixier and Al Hosn Gas.

Crude oil pipeline in Abu Dhabi, Photo: Emirates 24/7

In January 2014 the concessions for exploration expired after 75 years and a selection among the 11 bidders for the new concession has been conducted. Total SA and Inpex of Japan have been awarded a stake in ADNOC's new venture. Total SA agreed to pay a 2.2 billion US$ signing bonus for a 10% share in the onshore concession. Japan's Inpex has acquired a 5% stake in Abu Dhabi's prime onshore oilfields, paying an upfront fee of 1.1 billion US$ for its share.

The UAE Gas market

Besides oil exploration, gas production is another prominent industry arm. Abu Dhabi's gas production has increased significantly in recent years due to major projects to integrate offshore and onshore production of associated gas from large oil fields and reduce gas flaring. Abu Dhabi, which was the first Gulf state to produce LNG (liquefied natural gas), has long-term contractual commitments to export gas. At the same time domestic demand for gas, primarily used as a feedstock for power and desalination plants, has soared. Gas is also used for reinjection into oilfields to maintain wellhead pressure and in the rapidly expanding petrochemicals and fertiliser sectors.

Over the last few years, ADNOC's gas producing unit, ADGAS, has doubled its gas output to 2 billion standard cubic feet per day (scf/d), half of which goes to Gasco's facilities in Habshan for further treatment before it is pumped to the national grid in Abu Dhabi and the other emirates. ADGAS plans to increase production to 2.4 billion scf/d by 2017.

Dolphin Energy Ltd. was founded in 1999 in order to cover the local market supply. With headquarters in Abu Dhabi, the company began gas production in 2007. Dolphin Energy is 51% owned by the government investment fund and project developer, Mubadala Development Company, as well as by Total and Occidental Petroleum, who hold 24.5% each. The Dolphin Energy Project (7 billion US$) is one of the largest trans-border energy projects ever undertaken in the Middle East. The project involves production and processing of natural gas from Qatar's offshore North Field and transportation of the processed gas by subsea pipeline to the UAE. In 2010, Dolphin Energy finalized the Taweelah-Fujairah Pipeline, which enabled the transport of vital gas supply to the Eastern region of the UAE.

The UAE petrochemical market

The petrochemical industry was established in the UAE in 2002 with the foundation of the ADNCO Daughter Borouge. Initially the Ruwais plant had a total manufacturing capacity of 450.000 metric tons per year (t/y). By 2005, the complex consisted of an ethane cracker (EU1) built by an alliance of the companies Bechtel and Linde, and two Borstar® bimodal polyethylene units constructed by Tecnimont (PE1/PE2), each capable of producing 300.000 metric tons of bimodal polyethylene. (www.borouge.com)

In the second expansion in 2010 a 1.5 million t/y ethane cracker (EU2) was built by the Linde Group at a cost of 1.3 billion US$ and is considered to be the largest in the world. The first of its kind and largest Oelfins Conversion unit (OCU) capable of producing 752.000 metric tons of propylene a year, was built by Samsung Engineering using APP Lummus technology worth 300 million US$. This investment ensures the supply of 800,000 metric tons of polypropylene per year on two similar sized units. In addition, the Borouge 2 project also provided for the construction of a new polyethylene unit with an annual capacity of 540.000 t/y. The polyolefin units were constructed by Tecnimont of Italy at a cost of 1.9 billion US$. Off-site and utility facilities were completed by Tecnicas Reunidas of Spain at 1.2 billion US$.

Borouge is planning to complete its third expansion for a total annual capacity of 4.5 million tons in 2015. The expansion project under the name of Borouge 3 includes an ethane cracker, two polyethylene units, two polypropylene units, and a low density polyethylene (LDPE) unit. The company Bechtel provides management support for the implementation of the project.

In order to secure an overall political framework to develop petrochemical projects, the government authority Chemaweyaat, Abu Dhabi National Chemicals Co., was founded in 2008. However, their original plans have not all been realized yet. According to GTAI, a new upcoming milestone is the 10 billion US$ investment of the Tacaamol Aromatics Complex, which is scheduled to be completed by 2019. Tacaamol (Abu Dhabi Chemicals Integration Company) is a Joint Venture between Chemaweyaat and the PET producer Indorama Ventures from Bangkok (GTAI, May 2015). According to GTAI and Meed Project, the following projects are currently in progress:

Project	Investment value in Mil. US$	Project	Project sponsor
Borouge 3 Expansion Project : Ruwais PolyolefinsUnit	1.250	In Process	Borouge
Borouge 3 Expansion Project: Ruwais Offsites & Utilities	937	In Process	Borouge
Ras Al Khaimah Diammonium Phosphate (DAP)	950	Survey	Zuari Agro Chemicals
Al-Gharbia Chemicals Industrial City: Aromatics Complex	800	Tender	Tacaamol
Habshan Sulphur Formation, Granulation and Handling Facilities	500	In Process	Abu Dhabi Gas Industries (GASCO)
Al-Gharbia Chemicals Industrial City: Offsites &Utilities	500	Tender	Tacaamol
Ruwais Sulphur Handling Terminal - 2	624	In Process	GASCO

Source: MEED Projects/ GTAI April 2015

HP absorber for the Shah Gas Field arriving in Abu Dhabi, delivered by german SAL heavy lift, Photo: Arabian Oil and Gas

Activites of German companies

German companies enjoy a good reputation in the UAE market. Two milestones achieved by the German companies Wintershall and Linde in the oil and petrochemical sectors are as follows:

The German company Wintershall signed an agreement with ADNOC in June 2012 to take over the long-term exploration and development of the technically complex Shuwaihat sour gas and condensate field. The field is situated in the western region of Abu Dhabi, 25 km from the industrial town Ruwais. Together with ADNOC and the Austrian OMV, Wintershall is conducting a technical evaluation. The field evaluation includes up to three exploration wells and a 3-D seismic survey. Work on the first exploration onshore has been ongoing since spring 2014. Two additional (offshore) wells are planned for the future. According to Wintershall, a positive evaluation could make Shuwaihat one of the most important natural gas and condensate fields in the western region of Abu Dhabi. It would also help to meet the increasing demand for mineral hydrocarbons in the UAE and contribute to the country`s long term export capabilities.

Besides the above-mentioned activities of Linde, Linde has formed a Joint Venture with ADNOC, ELixier - ADNOC Linde Industrial Gases Company Ltd. The Joint Venture was founded in Dec 2007. Abu Dhabi National Oil Corporation (ADNOC) owns 51% of the Joint venture while Linde owns 49%. The joint venture is responsible for building and operating ASU Plants, which includes two of the largest of their kind in the world.

Despite the larger German companies (Wintershall; Linde; Bayer; BASF etc.) making headlines with their activities, numerous German SMEs, e.g. Maximator, Bauer Kompressoren; Endress + Hauser; Fienemann Torpede etc. are contributing to the success of the industry. In order to enter a tender with ADNOC, a company has to be registered with ADNOC. A local partner (preferably from Abu Dhabi) is required in order to start the registration process. Establishing a personal relationship and presence in the market are the main elements for a successful business relationship in the region.

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Saudi Arabia

The present situation

The Kingdom of Saudi Arabia has approximately one-sixth (260.2 bn) of the world's known conventional oil reserves. In addition the Kingdom is also rich in natural gas. In global comparison it has the fourth largest (297.7 tcf) natural gas reserves. Furthermore it has 600 tcf of unconventional shale gas reserves. With a share of 45% in GDP, the hydrocarbon sector is dominating the Saudi Arabian economy. Based on this high share of the GDP the current decline of the oil price has a direct impact on the balance of government budget. To keep up spending the Kingdom needs additional funds and has, therefore, started issuing bonds for the first time since 2007. From August 2014 to July 2015, the foreign currency reserves of Saudi Arabia decreased from nearly 2.8 trillion riyals (EUR 665 billion) to 2.5 trillion riyals (EUR 595 billion).

Last year, in the face of possible oversupply, Saudi Arabia abandoned its traditional role as the global oil market's swing producer and, therefore, its role as unofficial guarantor of existing (+100 US$ per barrel) prices. As the de facto leader of the OPEC cartel, it's long been viewed as a defender of oil prices with one ear to the market and two hands on a pipeline valve. The abandoning of the price keeper's position was carried out for the purpose of defending market shares for OPEC. The current behavior indicates that the securing of market shares has higher priority for the Kingdom than boosting the revenues from oil exports.

Trade Arabia

Economic structure

The main strength of Saudi Arabia is its upstream industry. Midstream and Downstream stand in the focus of current development policy. However, in order to reduce its dependence on the export business and therefore from the price of oil itself, the government has been investing vast amounts of money into different industrial sectors. One main objective was to set up a national petrochemical industry with a diversified portfolio clearly focused on the downstream industry and its complex products.

The processing of raw materials at the source is both efficient and lucrative. As the largest oil producer in the world, Saudi Arabia has a competitive advantage in the field of petrochemicals, which primarily uses oil and gas. Therefore the Kingdom has excellent prerequisites to secure a large market share. The advantage for the Kingdom is obvious: Whoever promotes the use of crude oil and gas, also determines the cost of production of the new downstream activities.

Saudi Arabia's current position in the petrochemical sector is already strong. Over the last 5 years a yearly growth rate of 20% was achieved. Jubail Industrial City, the world's largest contiguous petrochemical production complex, produces 7% of the global petrochemical output.

In addition 17% of the worldwide petrochemical exports stem from the Kingdom. The export volume of petrochemical products should be above 100 million tons until 2016.

Current projects

According to the diversification strategy, the focus of future investments is divided into different categories. The first category includes oil and gas projects that focus mainly on extending production capacities (Upstream/Midstream).

Saudi ARAMCO currently manages three major expansion projects. The first has an estimated contract value of 7 billion US$, while the two other contracts are valued at 4 billion US$ and 4.6 billion US$ respectively. In the southwestern part of the Kingdom, ARAMCO plans to build an export refinery located in Jazan Economic City (7 billon US$ est. contract value). The facility will be able to handle both heavy and sweet crude with a potential to integrate petrochemicals and power elements. The remaining two projects are located in the eastern province. ARAMCO plans to undertake a gas development program in Dhahran, in the northeastern province. This program, also known as Al Wasit

Gas program, should increase the Saudi Arabian gas production capacity by 21% (4.6 billion US$ est. contract value). The last project, which is under the management of Sadara Chemical Company (joint venture between SAUDI ARAMCO and The Dow Chemical Company), involves construction of a gas plant in Ras Tanura (4 billion US$ est. contract value).

The second category includes projects specializing in the further processing of oil and gas (Downstream).

Recently three major projects have gotten underway. The total value of all projects in this field amounts to 30.4 billion US$. The lion's share of the investment is in Jubail Industrial City, which is home to the world's largest petrochemical complex, producing 7% of the global petrochemical output. Sadara Chemical Company, a joint venture between ARAMCO and The Dow Chemical Company, invests 20 billion US$ to build a fully-integrated petrochemical complex in Jubail Industrial City 2. Additionally, the Al Jubail Petrochemical Company, a joint venture between Saudi Basic Industries Corporation (SABIC) and Exxon Mobile Chemical, is developing an elastomers plant with a production capacity of 400.000 tons per year (3.4 billion US$ est. contract value). As for the Kingdom's populous western region, an expansion of Petrorabigh integrated refinery and petrochemical complex is planned. This company is another joint venture between ARAMCO and Sumito Chemical Company.

Market entry potential for German companies

An interesting situation for German companies has arisen in Saudi Arabia. The diversification and expansion of the Saudi Arabian oil and gas sector continues moving forward and offers lucrative business opportunities. Including the above-mentioned projects with a combined contract value of 45 billion US$, there are additional investments planned for the Oil, Gas and Petrochemical sector as well as mining sector with a volume of 300 billion US$ by 2020.

Shaybah oilfield development oil refinery in Saudi Arabian al-Rub al-Khalil desert, Photo: The Daily Telegraph

Throughout the Gulf region, and especially in Saudi Arabia, the "Made in Germany" label has an excellent reputation. German companies stand for reliability and excellent quality.

In the oil and gas sector global players like BASF, EVONIK or LINDE, as well as smaller companies like Erndtebrücker Eisenwerke or the family owned Bischof+Klein benefit from this positive image and are already operating in Saudi Arabia. German medium-sized companies in particular are known for offering highly specialized products, services and expertise, all of which perfectly fit with current market demands.

Legal framework

Activities in the region require long-term and intensive commitment. A local representation is almost always beneficial and even a necessity in most cases.

Besides being able to find a local partner for the distribution of their products, German companies can form a joint venture with a local company to invest in the Kingdom or to sell their products directly. Typically, the local companies serve as financial and administrative partners, while the international companies operate mainly as technology suppliers. It is also possible to act locally as a consortium, which would eventually offer a full service solution.

Ultimately, it is also possible to register on-site in the form of a limited liability company or similar legal form; however this is rather costly.

From a Saudi Arabian perspective, a European, and especially German, capital investment in the Kingdom is in principle desirable. The investment law was introduced via the Investment Act Foreign Investment Law , or FIL. Under the FIL, a new authority was established: the Saudi Arabian General Investment Authority (SAGIA). Today SAGIA acts like a "one stop shop," offering all necessary administrative procedures and services for foreign investors.

Public procurement

In Saudi Arabia the public procurement sector plays an important role. The Kingdom has allocated hundreds of billions US$ for a variety of projects in its current and long term budget plans. Public procurements are auctioned via public tenders. Unlike other countries there is no central authority whose task is to coordinate the allocation of the public tenders. Each local party can award its tenders separately. All bidders must prequalify for the awarding authority in order to post an offer.

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Iran

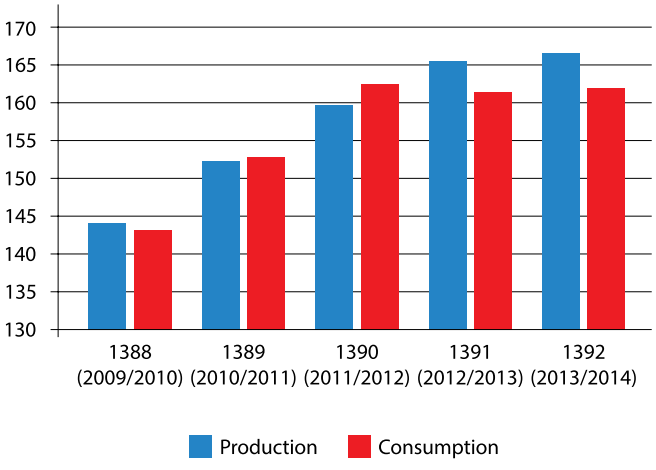
Oil power Iran pushes back

With 47.8 billion cubic meters of gas, Iran has the second largest oil reserves in the world right after Russia, followed by Qatar with 24.7 billion cubic meters, Turcmenistan with 9.9 billion cubic meters and the USA with 8.7 billion cubic meters. According to data from the Organization of Oil Exporting Countries (OPEC), Iran has proven natural gas reserves of 34.2 billion cubic meters.

The largest gas reserve in Iran is the North Dome/South Pars field, which belongs to Qatar and to Iran. Most of the field is in the sovereign territory of Qatar in the Persian Gulf (North Done) and the smaller part in the sea region of Iran (South Pars). The oil and gas corporation OMV and the state-run oil and gas company NIOC signed a declaration of intent in 2007 for exploration in the Zagros region and further development of the world's largest gas field, South Pars. Originally, the first 10 phases of the gas field in South Pars would not only serve the local demand, but would also supply the petrochemical industry, and the remaining 14 phases would be for export.

Nevertheless, due to sanctions on Iran and the massive pressure of the USA, the Vienna concern was forced to bring the project to a standstill. However, after the Vienna agreement with Iran, the new CEO Rainer Seele reinforced his company's interest in Iranian projects involving gas supply from Iran to Europe.

Development of Iranian gas sector (in bi m^3)



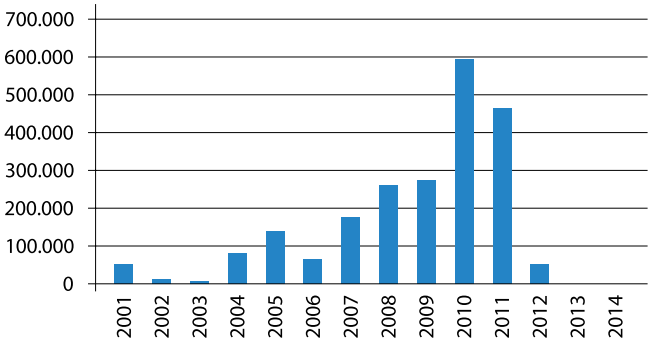
Source: National Iranian Gas Company (NIGC)

Iran consumes more than 90% of its gas production domestically and exports the remaining production mainly to Turkey, Armenia and Azerbaijan. Other countries like Iraq, Pakistan, India and Oman, and also Afghanistan are on the list to further reinforce export capacity. The demand in Iran has risen rapidly in this period, therefore, chances for German companies are good: after years of economic sanctions, Iran has accumulated a backlog of demand for innovation and new technologies.

Oil

Oil reserves in Iran are estimated at 158 billion barrels - in 2003, the estimated figures were around 90 billion barrels. The increase in the reserves is symptomatic, since this segment in the country was heavily underestimated in the last decades due to the lack of investiments of up to 200 billion US$. With this increase, Iran holds 11% of the world's oil reserves, surpassed only by Saudi Arabia, Canada and Iraq.

Iranian Oil Export to Germany (thousand Euros)



Source: Germany's Federal Statistics Agency

European countries' rejection of Iranian oil was responsible for half of the fall in exports, and the supply gap was compensated by other countries in North Africa and Near East. The Asia Pacific region is still the most important sales market for Iranian oil. To get around the sanctions on shipping and insurance, Iran has tried to serve Asian clients with "floating" oil fields of the National Iranian Tanker Company.

Some countries purchase oil and gas from Iran and pay with Chineses renminbi or Indian rupees; others like Turkey and

Russia seek alternatives and exchange oil and gas from Iran for gold and food ("Oil for goods"). Since the Vienna agreement, Iran now wants to increase its crude oil production by one million barrels a day and, thus, to recover a significant role in the oil and gas market, which is unlikely to occur until the end of next year. This will still be a difficult period for Iran. Currently, the world market is witnessing an excess supply of more than two billion barrels daily.

Iran is more and more dependent on the support of great oil concerns. "Iran is seeking to modernize", says Foreign Economy director of DIHK's umbrella organization, Volker Treier, and "there is a strong demand for German know-how", especially on the main weakpoint - the outdated infrastructure of the oil and gas industry. Finance and Economy Minister of the Province of Baden-Wurttemberg, Nils Schmid, who travelled to Iran recently leading a major economic delegation, shares this opinion: "Popular economy in Iran is in a huge need for renovation and modernization. This includes the oil and gas exploit segment above all. There is a demand for our machinery and equipment."

Iran's Oil and Gas Minister Birjan Zanganeh recently announced that after the frozen funds are released, the country is prepared to invest up to 100 billion US$ in modernization projects. Before the sanctions, multinational concerns including Eni, Statoil and Total among others, were active in Iran. Currently, they are the leaders in the competition for profitable contracts with Iranian government. "Iran is starting to be attractive to investors again." By the end of the year, Tehran will be able to offer new forms of contracts that correspond to international standards and can be attractive for oil and gas concerns," says Eni's CEO Claudio Descalzi.

The rules of the game have changed. In the past few years, sanctions on Iran have made an increasing number of foreign companies, including European ones, to suspend their activities in the country. While these foreign companies were not acting on the local market, Iranian companies have strengthened their presence. Nonetheless, they are totally dependant on support of from their more experienced partners to further develop local industry.

Iranian Central Oil Fields Company (ICOFC). Photo: theiranproject.com

Petrochemicals

Nowadays, the capacity of the petrochemical industry in Iran is around 60 million tons, but petrochemical plants produce only 40 million tons, which allows for an increase of over 20 million tons even if there is no additional investment. From the fourth and fith five-year development plan, 62 projects are still outstanding. Fifteen of these have been given priority and around 60% have been concluded. Five of these projects should be implemented this year, including the petrochemical plants Kavian 2, Lorestan, Mahabad, Takht-eJamshid and Marvdasht.

The new government in Iran is giving absolute priority to the petrochemical industry. Oil Minister Bijan Zanganeh has announced in his first days in office that the petrochemical industry wants to reach a new high point. According to him, this will allow petrochemical production capacity to increase by up to 100 million tons yearly with a value of around 40 billion US$. The first increase occured when Zanganeh was Oil Minister during former president Khatami's government.

The Oil Minister is trying to solve financing problems in the second phase of Asalouyeh with resources from the national development fund. In addition to the 62 existing projects, the new Oil and Gas minister is planning 36 new projects with a capacity of 60 million tons. Should all these projects be implemented, the total capacity will be able to increase to 180 million tons. For that purpose, a "Petrochemical Development Fund" could be created so that petrochemical projects could be assured better financial support.

The Iranian Oil Minister and the National Petrochemical Company have repeatedly declared that they are willing to support national and foreign investors in the petrochemical industry, with a worldwide reach. Media reports show that the National Petrochemical Company is currently the second largest manufacturer and exporter of petrochemicals in the Near East.

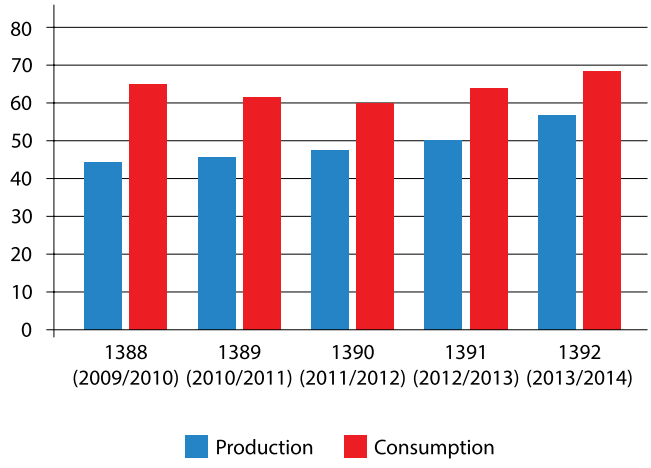
In 2012, of the 41 million tons of petrochemicals produced in Iran, around 15 million (a value of 12 billion US$) were exported. One year later, the Iranian government announced that demand for petrochemicals had risen in spite of the sanctions on Iran, especially from countries like China, India and African countries. Consequently, Iran announced the building of eleven small refineries with a total capacity of 10 thousand barrels in the country and another 9 refineries with a total amount of 20 thousand barrels abroad - most of them in Africa.

In addition, in 2013 Iranian companies signed two cooperation agreements with Turkish and Korean companies. The agreement with Turkey is about PVC manufacturing with a capacity for 350 thousand tons yearly, and the agreement with Korea is about the production of polymer mixtures with a capacity of 30 thousand tons yearly.

Gasoline

In order to protect the health of the population and fight air pollution after it reached critical levels, the Iranian government was forced to implement gasoline production in petrochemical plants and to import more gasoline from abroad.

Gasoline production and consumption (in million liters)



Source: National Iranian Oil Refining and Distribution Co.

From March 21 to August 16, 2015, 670 million liters of gasoline were imported, in an amount of 22 trillion Rial, around three times as much gasoline compared to the same period in the previous year. In spite of the introduction of the second subsidies reduction phase, the average consumption increased by around 1.5 percent to approximately 70 million liters. As a consequence of production projects in refineries in Tabriz and also in Isfahan in the near future, with a capacity of 3 to 5 million liters, experts expect a possible reduction of petrol imports. In the last two months, imports have fallen from 10 million liters to 5 million liters a day.

In June 2015, the Iranian government determined that the Oil Minister could only import Euro 4 gasoline. People from the Oil Ministry report the opening of the first phase of petrochemical project "Setareh Khalij Fars" next year in Iran, with a capacity of 12 million liters of gasoline a day, which should lead to the establishment of gasoline importing.

With the announcement of Euro 4 or 5 gasoline production at the Bandar Abbas petrochemical company, which complies with the European emission standards, the deputy Oil Minister affirmed that next year gasoline will not only be imported, but also exported. Abbas Kazemi also reported that production capacity in national refineries has increased to around 73 million liters a day, and that another 20 million liters should be included with the implementation of future production projects.

Currently, an average of 20 to 25 million liters of Euro 4 gasoline are produced in Tehran, Tabriz, Karaj and Arak, and other projects are planned in four major cities.

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Alliance for Integrity (AfIn): Collective Action for Business Integrity

The extractive industry is often associated with stagnant development and poor governance, in particular corruption. The close interaction between public and private actors and large-scale financial transactions involved in the export of natural resources make the sector prone to illicit practices which cause significant damage to the public interest and to society. As a result, foreign and domestic companies operating in the field of oil and gas face a high business risk. *The Alliance for Integrity* (AfIn) proposes to bring together public actors, companies, civil society and international organizations to collectively mitigate corruption risks. This novel approach provides a competitive advantage for businesses, especially in Brazil, where the Petrobras scandal makes integrity and transparency the topics of the day.

Fighting corporate corruption is moving up on the agenda of companies and governments across the world. In recent decades, anti-corruption laws and regulatory standards have proliferated, creating a dilemma for the private sector. Penalties and fines for engaging in corrupt practices are rising steadily, while corruption remains an endemic problem in many regions of the world. Consumers and non-governmental organizations too, pay ever more attention to transparent production, creating a business risk for companies that do not comply with the highest standards of integrity. Due to that, transnational companies are increasingly aware of reputational and social risks associated with non-compliance. This is particularly relevant for actors in the oil and gas sector, who already face increased public scrutiny because of the environmental impact associated with their operations.

In this matter, the Extractive Industries Transparency Initiative (EITI) promotes open and accountable management of natural resources. EITI stimulates governments and companies involved in the initiative to disclose information on tax payments, licenses, contracts, production and other key elements around resource extraction. The rationale behind EITI's approach is that more transparency will lead to more accountability.

Such initiatives are a first step towards the right direction. Nevertheless, even large companies are uneasy about changing corporate practices on their own. Companies typically fear to lose business, to be sidelined because of their 'bureaucratic' approach or to be simply replaced by less scrupulous competitors. This is especially true for the natural resource sector, where the provision of contracts is often highly political and offers are difficult to compare.

Likewise, governments and regulators aim to minimize corruption by stepping up law enforcement. Punishment can, however, only do so much. Prevention is the key to solving the issue of business integrity.

This is exactly where the AfIn steps in. Corruption prevention and business integrity are issues that affect society as a whole. Therefore, AfIn believes that collective action of all relevant stakeholders is the best way to solve this problem, to combat poverty and ensure social and economic development. Collective Action is defined by the World Bank Institute (WBI) as

> "[…] a collaborative and sustained process of cooperation amongst stakeholders. It increases the impact and credibility of individual action, brings vulnerable individual players into an alliance of like-minded organizations and levels the playing field between competitors. Collective Action can complement or temporarily substitute for and strengthen weak local laws and anti-corruption practices" (Fighting Corruption through collective action, WBI, 2008).

Relating to the concept of collective action, AfIn is a business-driven multi-stakeholder initiative between multinational companies, civil society, public organizations and international institutions. The aim of the initiative is to promote integrity among companies, their business partners and other relevant actors in the economic system. AfIn is currently active in Brazil, India, and Ghana, and is planning to expand to Indonesia and Turkey in the medium-term.

In Brazil, AfIn´s network encompasses partners such as the German Chambers of Commerce and Industry (AHK) in São

Paulo and Rio de Janeiro, the regional United Nations Office on Drugs and Crime (UNODC), the Global Compact Network Brazil, and the anti-corruption authority Controladoria-Geral da União (CGU).

Through regional formats, such as the De Empresas Para Empresas (DEPE) training program, AfIn has a strong presence in South America.

This holistic approach is reflected in the three core principles of AfIn. First of all, AfIn stresses its openness to all actors that support its aims and principles, whether they are companies, public institutions, or non-governmental organizations (NGOs). This comprehensive approach enables AfIn and its members to build coalitions and tackle the root causes of corruption.

Secondly, AfIn builds on the principle of equal footing. In order to establish a mutually beneficent partnership, all relevant stakeholders participate on an equal footing, regardless of whether they represent civil society, public institutions, small- and medium-sized enterprises or large corporations. Stakeholders from developing and industrial countries share information and cooperate on an equal basis.

Thirdly, AfIn follows a results-based approach. The aim of AfIn is not to reinvent the wheel, but rather to build on best practice instruments, formats and initiatives in order to achieve a concrete impact on the ground. For this purpose, it offers a toolkit with different activities, including peer-to-peer learning, public-private dialog, various training formats and sharing of best practices and knowledge which will be explained in more detail in the following section.

Peer-to-Peer Learning: the best way to learn is from others who encounter similar problems. Due to that, AfIn encourages its members to share the challenges they face in different sectors and regions among each other. Best-practice examples provide suggestions and innovative ideas on how to effectively foster business integrity in a company and in the economic system as a whole. AfIn emphasizes the principle of equal footing in peer-to-peer learning and knowledge-sharing. Stakeholders learn from each other on an equal basis, whether they are from Brazil, Ghana, India or Germany. The Alliance for Integrity aims to enable peer-to-peer learning by organizing panels, trainings, and workshops to foster dialog among its participants.

Public-Private Dialog: AfIn aims to remove the taboo of talking about corruption, which remains strong in most societies. Therefore, it is necessary to raise awareness among all relevant stakeholders. Participants of AfIn have the opportunity to engage in the mutual exchange between businesses, political administrations and civil society representatives. Public-private dialog helps to create an enabling environment and improves the overall framework conditions for business integrity. Furthermore, the regular exchange between all relevant stakeholders from the public and private sector helps to build confidence and trust among participants, encouraging them to pursue collective action measures.

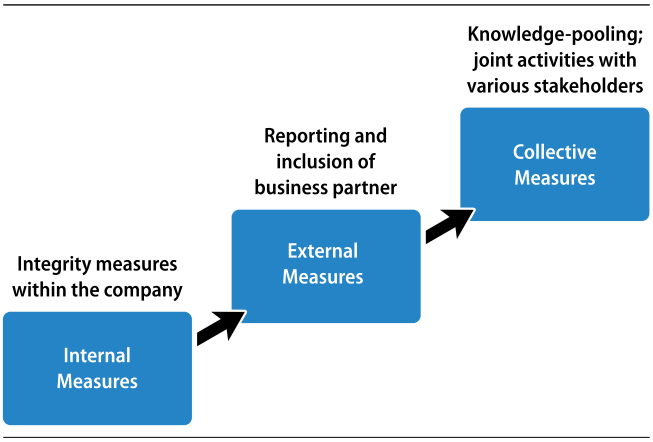
Trainings: AfIn´s workshops and training courses, such as the DEPE program, allow participants and their business partners to learn, train and implement concrete measures to increase integrity in their organization. For this purpose, AfIn offers a toolkit of workshops and trainings which was developed in cooperation with the German Global Compact Network. Trainings and train-the-trainer programs target business representatives, who are just starting out with a compliance management system (CMS) or who seek to improve their already existing CMS.

A web-based support desk assists companies in implementing anti-corruption measures in day-to-day activities. Companies can post inquiries and typically obtain answers from experts within three working days. Companies that took part in workshops receive access to the support desk for one year; other companies have to register to access the support desk. In the future, AfIn will offer workshops regarding different areas from a beginner's level to an advanced level.

To step up the fight against corporate corruption, AfIn proposes a concrete three-step model, which was originally developed by the World Bank and has been implemented by the German Global Compact Network.

The model envisages measures on three scales that build on one another: firstly, internal measures within the company, secondly, external measures such as communication and outreach to business partners, and thirdly, collective measures, including resource- and knowledge-pooling or joint activities with other stakeholders. Similar models were advanced by the World Bank (cf. WBI, 2008).

Fig.1: Three-step model to increase business integrity



1. Internal Measures: business integrity within the company

Internal control measures help identify and minimize corruption risks. The first step to an effective CMS is the drafting of a code of conduct or compliance guidelines. Relevant documents should be prepared in a written format and disseminated among all employees of the company. It is crucial that the guidelines are openly communicated and made accessible to all employees. In some cases, this involves translating the documents into different languages or drafting separate guidelines, outlining practical examples and using easy language. The company's management needs to publicly endorse the effort to enhance business integrity. The "tone from the top", the management's support of corruption prevention measures, is important to signal that the issue is taken seriously (cf. WBI, 2008).

In the next step, companies should conduct a risk-based analysis of their business activities and seek to incorporate compliance measures in their business model. The risk-based screening allows the company to focus compliance measures on areas where corruption is endemic. A compliance system that is focused on high-risk areas is more effective and provides an added value for the company.

Internal measures should be embedded in a wider business integrity policy that is first and foremost communicated to employees, rather than the general public. The implementation of the new business integrity policy should go hand in hand with trainings and workshops for employees at all levels. Practical examples and activities ensure that business integrity measures do not only exist on paper, but that employees internalize what compliance means and how it is implemented effectively in day-to-day activities.

It is important to note that there is no one-size-fits-all model for business integrity measures. Therefore a risk-based approach is the first step towards creating an individualized business integrity policy that effectively minimizes corruption risks. The overarching goal should be to create a company culture that values transparency and integrity.

2. External Measures: reporting and inclusion of business partners in business integrity measures

After drafting and implementing an internal business integrity policy, it is time to move on to the next step. Both public institutions and customers place ever higher demands on companies to strengthen transparent and clean business practices. Companies benefit from establishing an effective compliance management system, as it will enhance a company's reputation and stance among customers as well as potential business partners. To reap the economic benefits of corruption prevention measures, the company should engage in communication and outreach activities while continuously strengthening its business integrity policy. For this purpose, the company should conduct a thorough assessment of its business integrity policy and report regularly, e.g. annually, on its activities as well as on shortcomings. Control mechanisms and the compilation of regular reports serve as important tools to identify and correct weaknesses in the compliance management system. Furthermore, the publication of regular reports on corruption prevention measures showcases the modern and transparent approach of the company and will in the long run increase its reputation, thus generating a concrete economic benefit (cf. WBI, 2008).

At this step, the scope of the company's business integrity measures should be extended to include all relevant business partners throughout the supply chain. It is important to note that corruption risks in the supply chain can have a devastating impact on the reputation and the overall business success, even if the company itself has an effective internal compliance management system. This is why it is crucial to expand business integrity efforts to business partners. Companies should seek to raise awareness for business integrity measures among their suppliers, and if appropriate, share their knowledge and provide support in identifying corruption risks in the supply chain. Small- and medium-sized enterprises and suppliers are disproportionately affected by corruption and typically lack the financial and human resources to install effective compliance management systems (cf. WBI, 2008).

AfIn offers an innovative approach to solving the issue of corruption risks in the supply chain. As it was already mentioned, it allows companies to support their business partners and suppliers with cutting-edge compliance trainings and workshops, thus fostering transparent and clean practices in the supply chain and in the company strategy as a whole.

3. Collective Measures: resource- and knowledge-pooling; joint activities with various stakeholders

As a third step, companies should engage in collective action to minimize corruption risks before they become eminent. Prevention is the key to solving the issue of business integrity. This is exactly where AfIn takes action.

Taking part in AfIn, allows companies to benefit from resource- and knowledge-pooling, sharing of best practices, and conducting joint activities with various stakeholders.

The participation in collective action initiatives offers business advantages for companies. It serves as an important tool for

companies to signal their commitment to business partners, public institutions and customers. In the end, collective action strengthens the reputation of a company. Moreover, compliance measures reduce production costs associated with corruption and increase the competitiveness of a company.

The overarching aim of AfIn is to foster compliance among companies, their business partners and other relevant actors in the economic system. AfIn acts as a learning and implementation network that supports all relevant stakeholders in collectively fighting corruption risks.

Noor Naqschbandi, Project Director, Alliance for Integrity

For further information, see http://www.allianceforintegrity.org.

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MAN Diesel & Turbo

MAN Diesel & Turbo, with headquarters in Augsburg, is an international leader in the supply of large diesel engines and turbo machines for maritime and stationary applications. The delivery and performance spectrum of MAN Diesel & Turbo comprises complete ship engine systems, turbo machines both for oil and gas solutions and for the process industry, as well as complete power plant solutions.

Under the brand MAN PrimeServ, customers receive after sales services globally. The company is in operation in over 100 international locations. In Brazil, the company has been in operation for decades. In the 60´s and 70´s, it had produced large diesel engines under license. With the main office in Rio de Janeiro, the company hires more than 300 employees in 5 locations.

The most recent success story in Brazil is a follow-up order from Petrobras of two additional offshore screw compressors. In 2013, MAN Diesel & Turbo had already received an award of contract for six units in a total amount of EUR 30 million. The third unit has been delivered recently, providing customers total satisfaction. Those are the Vapor Recovery Units for FPSOs, with a local content of over 50%. "The follow-up order shows that we are capable of producing high quality value MAN technology in Brazil. We are very proud of having successfully overcome this big challenge together with our local partner. A great deal of responsibility for this success can be attributed to the expansion of local engineering and the project management team, and also the good cooperation between the parent company, MDT Brasil and our local partner", says Jens Hueren, director responsible for Brazil.

Made in Brazil: Vapor Recovery Unit with double-stage process gas screw compressor with a local content of more than 50% for application in FPSOs of the national oil giant Petrobras.

Repair and replacement part production at MAN PrimeServ in Petrópolis, Brazil

MAN Diesel & Turbo has led a different way from that of other international turbo machine manufacturers in the international market, which have made direct investment on assembly lines in Brazil and now are facing problems to fill these capacities. After a careful selection, MDT has decided to work together with a local partner. Among the reasons for the choice are the partner´s experience manufacturing turbo machines and also their knowledge of the high demands of the oil and gas industry concerning certification and inspection.

Besides the added local value with the new structure, the after sales service needs to be represented locally in a competent way. This leads to overcoming intercultural barriers and to better, more effective communication, avoids the long customs clearing process and also the long transportation ways to Europe, thus providing speedier service and, consequently, more satisfied customers. MAN Diesel & Turbo has a highly qualified pool of service personnel in Brasil, allowing for problems to be solved locally. In case of more complex repairs, a proprietary workshop is available in Petrópolis. The workshop is equipped with one of the most modern machine parks in Latin America. This allows MAN Diesel & Turbo to take care not only of their own equipment, but also other types of turbo machines and rotating equipment.

As diesel & gas power plant suppliers, MAN Diesel & Turbo, with an installed capacity of around 2.000 MW, plays an important role in safeguarding energy supply in Brazil, especially in the form of backup equipment for peak loads. Besides that, the development of new oil reserves on the coast of Brazil

offers a huge potential for the delivery and servicing of MAN diesel engines and turbo machines. In Brazilian shipyards, in the scope of the fleet modernization and extension program PROMEF under contract with Transpetro are the logistics division of Petrobras, 28 oil tanks, all of them equipped with two-cycle-engines with a performance of 22.000 HP each, as well as generators and propellers produced by MAN. In the offshore area, supply ships and special vessels are especially interesting for the four-cycle engines from Augsburg. Also in this area, together with the Brazilian service team and the maintenance and repair workshop, MAN PrimeServ meets all customers´ needs locally.

Especially important for the Brazilian labor market is the continuous investment on human capital, that is, capacity building, career planning and ultimately employee motivation and loyalty. MAN Diesel & Turbo has focused on this trend from an early stage. For many years, employees in Brazil have been receiving capacity building and continuous development on several fields internally. The professional, high quality value development of internal trainings has allowed for this to be offered to the Brazilian labor market as well as to local customers. In the last two years, diesel engine and turbo machine trainings have been offered at MAN PrimeServ Academy Brasil in Petrópolis. Together with theoretical knowledge, practical skills are also learned with the help of simulators and also extra hardware prepared for training purposes - gas turbines, steam turbines, compressors and also four-cycle engines. Capacity building according to the direct demand and the career planning linked with that safeguard the permanent availability of 200 qualified service employees for onshore and offshore operations.

Much has been said these days about the crisis in Brazil; however, the service area for the turbo machine and diesel engine industry shows considerable prominence in the oil and gas industry with no decline whatsoever. Doubtlessly, there will be more investment in the future. In a much slower motion, not as abruptly (and unrealistically) as in the beginning, but continuously, though.

MAN Diesel & Turbo is extremely well equipped for the future in Brazil.

MAN PrimeServ Academy Brasil - first class supplier for the qualification of specialized forces in the area of power plant, ship diesel and turbo machines

Raytheon Anschuetz - New Intelligent Bridge System for PSVs

In times of crisis, economical ship building, greater efficiency and user friendly operation are more important than ever before. These demands can only be fulfilled when on the bridge all necessary functions are intelligently integrated. Raytheon Anschuetz is therefore bringing a new, more intelligent generation of an Integrated Bridge System on the market. This new platform and intelligent multifunction displays reduce shipbuilding costs due to a simplified installation and increase both the degree of integration on the bridge and ease of operation.

For the new bridge, Raytheon Anschuetz has now developed a modern integration platform which further improves both the nautical and the economical operation of the ship through intelligent integration of functions. The new platform makes possible not only the integration of additional applications such as automation data indication, CCTV, DP system or load- and ballast calculator, but also the full scalability and future expandability of the bridge system. Intelligent multifunction displays provide the ship's command with the optimal nautical task at the right time as well as other ship control functions, at any desired workplace.

The use of standardized hardware and software simplifies the design of individual bridge systems and reduces the costs of installation and spare parts logistics. Based on this concept, modular system solutions are possible, from the tanker or containership, the offshore supply ship and the mega yacht on up to the aircraft carrier and cruise ship.

More safety

Operating safety is considerably increased by a newly developed distribution of the navigation data and system configuration within the bridge system. The new "Consistent Common Reference System" (CCRS) continuously monitors sensor data available on board with regard to validity, consistency and accuracy and rates the data with a quality indicator. From this information a set of the best sensor data is compiled, which is then distributed in the Integrated Bridge. In addition, the new "Health Monitoring" system checks the status of each individual console and regulates, if necessary, take-over of the navigational task at another workplace on the Integrated Bridge or restarting of the console itself. In this way the highest possible availability of data and functions is guaranteed on the bridge.

In order to counteract the high stress on board, Raytheon Anschuetz has outfitted the Integrated Bridge with an intelligent Alarm Management system. Under the auspices of a German research project, a concept was advanced which is based on the classification of alarms with respect to their relevance in the whole system. This study was further refined, optimized and now forms the core of an intelligent Alarm Management system in the new bridge generation.

Based on the system configuration and the status of the attached sensors, the system checks whether the error of an individual sensor is sufficiently critical to set off an alarm, or whether the error only needs to be indicated to the watch officer for information. The ship's command is thus relieved by having fewer blinking displays or continuous beeping to attend to and concentration on really important alarms is increased.

Less installation costs

Using a modern integrated platform based on a local network with standardized hardware and software allows the shipyard to reduce the cabling efforts, improving at the same time the maintenance works due to simplicity in design and commissioning.

The new bridge system builds on the proven product line of Anschuetz BridgeControl®. Besides the intelligent multifunction PC with displays, which are expanded by additional functions for Radar and ECDIS, a new bus control and the new adaptive Trackpilot NP5000 belong to the new generation. Raytheon Anschuetz thus presents a concept which combines the know-how from a broad palette of individual navigation products in one cohesively developed bridge system.

Proven

After initial sales on the ocean going vessel market, Raytheon Anschuetz reports the award of several contracts about the delivery of navigation systems for offshore operating

vessels. Among them, Nam Cheong Dockyard of Malaysia, has chosen Raytheon Anschuetz Singapore for the supply of the total navigational bridge equipment to two 75 meter multipurpose offshore support vessels. The DP2 vessels were build in 2011 and provide anchor handling capability as well as accommodation for up to 220 people when conducting offshore maintenance works.

The scope of supply comprises a redundant Anschuetz Standard 22 gyro compass and NautoPilot 2025 autopilot system, Raytheon Anschuetz NSC Radars as well as the full package of sensors and radio communication equipment for sea area A3. Raytheon Anschuetz Singapore takes full responsibility for system integration in full accordance with ABS class rules and setting in operation. Another contract covers the supply of gyro compass, autopilot, sensors, radio equipment as well as radar system integration for a 60 meters AHTS newbuild, which will be constructed at Malaysian Berjaya shipyard.

FIRJAN - Federation of Industries of the State of Rio de Janeiro (Brazil)

Targeting strategies in the oil and gas market

There is no doubt that the oil and gas market is going through a time of necessary restructuring, with oil prices falling and output growth lower than expected. The global economy has undergone several moves that negatively affect all sectors, such as the markets of China and Greece.

After years of strength, following the commodity supercycle, we are at a tipping point, with the breaking of the world's O&G investment pace. Brazil is not far from this reality, however, O&G production in the country increased by around 20% between January 2014 and July 2015, reaching more than 3 million barrels of oil equivalent a day the last month. In the same period, the Pre-Sal production maintained a significant growth, now representing one-third of the Brazil's production.

These data demonstrate, in part, Brazil's potential growth potential. Regarding proven oil reserves, we have more than 15.3 billion barrels, accounting for more than 20 years of production activities considering the current production. In addition, the market estimates that we still have up to 100 billion reserves to be appreciated.

In this scenario, we highlight the role of Rio de Janeiro. Besides holding the majority of the country's reserves, the state is responsible for over 60% of the oil and natural gas, as well as it's in the state's geographical boundaries that the main current and future producing areas are located and, therefore, most of the leading companies in the production chain that supports these activities. The shipping industry is no different: Rio de Janeiro has the majority of the jobs and productive capacity in the country.

As opportunities in the state of Rio de Janeiro, we can highlight the Petrobras divestment plan, which should include active exploratory areas and natural gas logistics. It would also be productive to search for investment partners, for example, to develop petrochemical complex project in Rio de Janeiro – COMPERJ, in Itaboraí.

The success of this industry depends on several factors such as the efficiency of the supply chain, leaders with entrepreneurial vision, the availability of qualified professionals, technological innovation and a business environment favorable for it to increase productivity, efficiency and competitiveness. Especially in difficult times, we must not only take advantage of opportunities, but also creates them.

Sistema FIRJAN has the role of ensuring sustainable development of the industry and, therefore, operates in key areas, promoting business competitiveness, education and worker's quality of life and their families.

The Federation brings together more than 7.000 industrial member companies, representing market segments focus to the economy of Rio, promoting the state of the business environment and supporting their growth and sustainable development.

Sistema FIRJAN's field of action occurs in 92 municipalities of Rio de Janeiro state by nine Regional Offices. The representations are cells that promote associations and act as catalysts of the demands of local industries, to improve the productivity of enterprises.

Investors interested in participating in projects in Rio state have yet to Support Core Investor, which offers quality information, dialogue with the government and support with infrastructure to support the decision by the project in the state. In times of increased caution on the use of resources, it becomes even more important with the joint institutions to support decision making and implementation of these new investments.

That is why we emphasize the importance of strengthening ties with other countries and promote the exchange of good practice. We will continue to contribute to the economy by stimulating partnerships, technological advances and improving productivity and competitiveness of our industries.

Oil, Gas and Shipbuilding Management – Sistema FIRJAN

APEX Brasil - Brazilian Trade and Investment Promotion Agency

Interview with David Barioni Neto, President

1 – How can Apex-Brasil assist companies in the oil and gas sector that want to invest in Brazil?

The Brazilian Trade and Investment Promotion Agency (Apex-Brasil), which is linked to the Ministry of Development, Industry and Foreign Trade (MDIC), works to attract foreign investment from companies that can contribute to Brazil's economy and improve the competitiveness of the Brazilian industry by bringing new technologies and opportunities for the whole production chain.

On a daily basis, this work takes the form of proactive prospecting of companies with potential to invest in the country, support for investors by providing information to support their decision-making process, organization of meetings within all government levels (federal, state and municipal), support during site visits to select the best location to establish the plant, among other forms of assistance.

The aim of this work is to minimize investment risks by presenting the potential investor with issues that every business should consider when opening a production plant in Brazil. At the moment, the priority sectors for attracting foreign direct investments are oil and gas, renewable energy, research and development and automotive.

David Barioni Neto. Photo: Stock photo APEX

2 – What are the oil and gas sector's main drivers in the coming years? In which areas are there opportunities?

As the oil and gas sector is one of the Agency's priority sectors, Apex-Brasil carries out missions and events to make contact proactively with investors interested in establishing an operation in Brazil. The goal is to explain the opportunities of investing in the country.

One of the main drivers today is Petrobras' business plan for 2015-2019, which represents opportunities worth $130.3 billion US$ – 83% in the exploration and production area, focusing on Pre Salt.

This is a significant opportunity in terms of goods and services to be acquired by Petrobras. An important factor regarding Brazil´s oil and gas sector is that local companies are obliged by law to comply with minimum local content requirements –thereby boosting the development of the country's production chain.

The main opportunities relate to the subsea sector, where requirements for equipment change with every 300 meters of water depth; exploration off the Brazilian coast extends as much as 7.000 meters below sea level.

Currently many technological challenges exist that must be overcome in order for pre-salt to be harnessed, which means there is a lot of room for new businesses.

3 – What initiatives does Apex-Brasil carry out to attract investments in the oil and gas sector?

Apex-Brasil's experience in working with this sector over the years has shown there is a certain preference among foreign companies to enter the Brazilian market through partnerships with local companies. This led the Agency to adapt their method of attracting these investors. Accordingly, in partnership with the National Oil Industry Organization (ONIP), we are now running the Brazilian Petroleum Partnerships (BPP) project.

In the project's first phase, a market assessment was conducted to seek Brazilian firms interested in establishing partnerships with foreign companies. Twenty-one companies from

various areas of the oil and gas sector that were considered mature enough for venturing into international partnerships were selected. The selection was very detail-oriented process, involving support from a technical consultant with particular expertise in the area.

At the current stage, the project is prospecting potential foreign partners who seek to establish partnerships that include technology transfer. Without a doubt, Germany is among the countries with the highest potential for us to find these potential partners.

This type of business model can result in an enormous savings of time and resources for investors, as this is a sector with many specific features. For example, to be authorized to sell to Petrobras, the largest buyer in the region of Brazil, the company must be registered in a database. The registration entails a number of criteria that are analyzed by Petrobras. Most of the Brazilian companies selected by BPP are already in this database. In addition, all of them have experience in foreign markets, a bilingual team and potential for innovation. All this helps when it comes to establishing a partnership.

4 – Could you mention some success cases involving foreign companies that have set up in Brazil in the oil and gas area with Apex-Brasil's help?

Yes, of course. In Rio de Janeiro, for example, GE opened a global research and development center in 2014, whose establishment received Apex-Brasil's full support. In the same year, the multinational company announced an additional investment of $250 million US$ in this R&D center; combined with the $250 million US$ it had already announced in 2010, the total investment adds up to $500 million US$ over a period of four years.

Another example would be NKT Flexibles. The company received Agency support when it decided to install a production plant in Brazil, also in the region of Rio de Janeiro. Apex-Brasil provided several years of assistance, starting with their first inquiry for information about the possibilities in Brazil to the investment announcement. The information the Agency provided to the company included details about potential suppliers, taxes and incentives in each state and salary levels broken down by function and state. In 2014, the company opened its Brazilian operation, having invested $200 million USD in total and expecting to generate 400 jobs. The company was already under the control of National Oilwell Varco (NOV), the American multinational that acquired NKT Flexibles in 2012.

In the next years,
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Brazil, besides being the largest country in Latin America and the seventh largest economy in the world, is a strategic choice for investors.

Contact Apex-Brasil and prepare to be impressed by the Brazilian talent.

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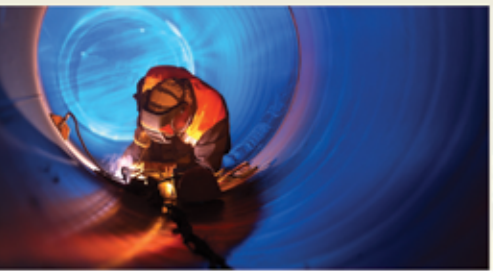

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