

Oil & Gas: Innovation and IP Protection to Combat an Uncertain Future

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The recent slump in oil prices coupled with a depletion of existing reserves has caused the energy marketplace to focus upon diversification strategies and a movement toward innovation driven alternatives. The major players in the oil and gas industry are realising that, in the new age of innovation and technological advancement, those who can adapt and develop new technologies are better able to control and influence the market.

In the summer of 2014 a barrel of crude oil cost over US\$100 and in 2016 the price had dropped by nearly half. This trend was caused by various factors, including an increased supply along with a decreasing demand.

The volatility of the market has adversely affected Gulf countries that depend heavily on oil revenues and stability within the sector.

Accordingly, countries such as the UAE, Saudi Arabia and Qatar have increasingly focused upon innovation efforts and are recognizing the value of diversification of intellectual property (IP) assets. In this article, we examine the innovation and diversification efforts of various national oil and gas companies (NOCs) in the Gulf region, and examine how structured strategies for diversification of IP protection (namely patents), can aid oil producers to fend off detrimental volatility and the uncertainty it causes.

How innovation impacts the oil and gas industry

It is indisputable that in the last decade innovation has played a fundamental role for the oil and gas industry. The industry has been steadily redefining production possibilities, largely due to technological advances which have allowed extraction of fossil fuels that were not previously possible.

The protection of IP has had a direct impact on these advances. Statistics provided by the United States Patent and Trademark Office (USPTO) show that the number of patents granted in the oil and gas sector has grown at a double-digit rate in the years following the 2008 recession.

The leading innovators have typically been service and equipment providers, resulting from their increasing investments in R&D. For example, in 2013 alone, Halliburton invested US\$588 million in R&D, an increase of more than \$100 million on its 2012 investment. The increase in R&D has had a direct correlation to large patent portfolios.

Unlike oil and gas service companies, NOCs have historically lagged behind in recognising the value of innovation and in seeking IP protection, although this trend is changing.

In particular, NOCs are recognising that if new innovations are adequately protected, it enables them to maximise the benefit of those innovations. This includes harnessing the potential for income generation through licensing, preventing others from entering the market through patenting, procuring a competitive advantage from innovative technologies, and gaining access to other technologies through favourable cross-licensing arrangements.

United Arab Emirates

In the UAE each emirate controls its own oil production and resource development. The majority of UAE's oil production comes from the emirate of Abu Dhabi, which accounts for around 95% of the country's oil and gas. The Abu Dhabi National Oil Company (ADNOC) accounts for more than half of Abu Dhabi's oil production. With 21 subsidiary companies, and operations covering all aspects of upstream and downstream processes in the energy industry, ADNOC is currently the world's 12th largest oil producer.

In recent years, ADNOC has made a focused push to increase innovation efforts through R&D investment. An example is the funding and establishment of the Petroleum Institute University and Research Center (PI). PI is not only a teaching university but also acts as ADNOC's R&D arm. In further efforts, ADNOC has also partnered with Abu Dhabi's Technology Development Committee for centralised and focused IP management services, which includes the management of ADNOC's patent portfolio.

This increased focus on IP protection and diversification has successfully led ADNOC to leverage proprietary technologies through commercialisation. As an example, ADNOC recently entered into an agreement with Schlumberger, a world leader in drilling technology, to license ADNOC's proprietary offshore drilling technology for use in Schlumberger's portfolio of drilling services. The technology greatly improves offshore drilling operations by improving borehole stability and reducing drill times, with significant potential savings for operating companies.

ADNOC has further diversified by investing in the petrochemicals industry. Petrochemicals are chemical products derived from petroleum, such as plastics. ADNOC entered into a joint venture with Austrian based Borealis, to form Borouge (based in Abu Dhabi), a leading provider of innovative polyolefin plastics solutions. Borouge has its own R&D facility which serves as the focal point of innovation and research in the field of polymer development and technology. Since the inception of the research and development operations a few years ago, Borouge has filed over 200 patents, which accounts for about 30% of all patents filed by UAE applicants and registered in the World Intellectual Property Organisation (WIPO) database.

Saudi Arabia

Saudi Arabia has recently resumed the position of the world's top oil producer from the U.S., according to the International Energy Agency. The country's national oil company, Saudi Aramco retains the most proven reserves and production of hydrocarbons worldwide. The Kingdom has reserves of 266 billion barrels, according to government estimates submitted to the Organisation of the Petroleum Exporting Countries.

Saudi Aramco has notable assets, including some of the world's largest crude oil reserves, one of the largest daily producers of oil, and owner of the Ghawar field, the world's largest oil field.

The company strives to foster a culture of innovation and exploration. Saudi Aramco's R&D activities are focused on innovative ideas to make its resources more accessible, useful, sustainable and competitive. It is apparent that the company recognises that achieving innovation success requires consistent and diversified efforts with respect to R&D.

One aspect of Saudi Aramco's innovation strategy for diversification of its IP assets has been to create a global research network with the establishment of research facilities in targeted innovation hubs in the US, Europe and Asia. This has provided the company with a large pool of research talent globally. Its current research hubs include the King Abdullah University of Science and Technology (KAUST), and research centers in Boston, Houston, Paris, and Aberdeen, all focusing on a variety of specific technologies. These facilities are aligned and integrated with Saudi Aramco's central R&D organisations and its core businesses goals.

This focus on R&D has allowed Saudi Aramco to build a diverse IP portfolio, which it leverages by commercialisation and collaboration with other industry leaders. The company's patent procurement strategy has primarily focused on areas where IP protection provides a competitive advantage, global

recognition and product differentiation. In 2014, Saudi Aramco was granted 99 patents by the U.S. Patent and Trademark Office, the most in a single year in its history, and 154 new patent applications were filed.

The company's efforts to pursue and diversify its IP assets ranks it first among Arab countries in globally registered patents, holding around 45% of the total number of registrations.

Further diversification includes research areas in catalyst development, materials science, nanotechnology, robotics and solar energy materials.

Qatar

Qatar Petroleum (QP) is the state-owned public corporation responsible for the Qatar's oil and gas business, both domestically and internationally.

QP has invested in a diversified portfolio of companies and activities including the exploration, production and sale of crude oil, natural gas and gas liquids, refined products, synthetic fuels, petrochemicals, fuel additives, fertilizers, liquefied natural gas, steel and aluminum.

In 2009, QP set up the Qatar Petroleum Research & Technology Department which was tasked with planning and executing its R&D needs for existing and new technologies, in an effort to broaden and diversify its business opportunities.

In just over two decades, Qatar has managed to transform itself from a small oil producer to a global supplier of energy. Today, the country is the world's largest liquefied natural gas (LNG) producer with a production capacity of 77 million tonnes per annum (MTA). This significant achievement was possible due to QP's long standing relationships with international partners including ExxonMobil, as well as through fostering an investor-friendly atmosphere which focused on innovation.

In 2015 Qatar reported LNG exports of 77.8 MTA, which allowed it to maintain its status as the largest LNG exporter, a title it has now held for a decade. The country accounts for just shy of a third of the global LNG supply.

Innovation is the major factor that has enabled Qatar's LNG industry to flourish, and this has in turn significantly shielded QP from the volatility of crude oil prices. At the Qatar Science and Technology Park in Doha, international partners like ExxonMobil partner in R&D efforts, new ideas and technological developments which are focused on environmental management and LNG safety. Through seeking and fostering international partnerships, QP has been able to bring important technologies to Qatar, which has resulted in milestones, such as deeper production wells which produce gas at higher flow rates than wells in other places such as the Gulf of Mexico and the North Sea.

Recommendations for IP strategies

The view of IP, particularly patents, has shifted in the industry from merely being a legal instrument to an important financial asset and weapon. As discussed above, IP assets rather than physical assets have become more and more important to corporate wealth and to keeping a competitive advantage.

In the oil and gas industry, IP is generally protected under either a trade secret or through patenting. Trade secrets, however, do not allow the company to exclude others from using a particular technology if they have themselves independently developed it, whereas a patent gives the owner the exclusive right to practice the invention, the right to license it, and the right to exclude others from using the technology, which ultimately results in a competitive market advantage.

There are additional risks involved with trade secrets, such as reverse engineering of processes or products. Particularly in the GCC region, trade secret laws are weak and not well established, thus making the enforceability of rights a difficult exercise. The foregoing are notable considerations when companies

are evaluating their technologies for protection under trade secrets versus patenting. On the other hand, patenting allows oil and gas producers to generate licensing revenues, ensures them freedom to operate, and provides bargaining chips to be cross-licensed or leveraged with other industry leaders.

A well designed patent strategy identifies the key business goals of the company, identifies the key players and competitors in that the particular technological field, and determines the focus of the patent portfolio, whether defensive or offensive. Defensive patents are those designed with the primary intention of defending a company against patent infringement lawsuits, whereas offensive patents are sought to protect and monopolise the invention by excluding others or by commercialising through licensing. An effective patent strategy is to diversify the patent portfolios to include both defensive and offensive patents, which allows a company to use its IP portfolio as both a sword and a shield.

Once an invention has been identified and selected for a patent application, several factors should be considered to determine the protection strategy, including territorial coverage and patent filing routes. The determinative factors include potential markets for the exploitation of the invention, cost, timing, the expected importance or commercial viability of the technology and how the technology aligns with the company's core business plans.

A typical patent filing strategy in the oil and gas industry involves filing a first patent application (which can be in the home country), followed by a PCT International Application (Patent Cooperation Treaty), which allows applicants to simultaneously pursue individual patent applications in a large number of countries that are party to the PCT, up to 30 or 31 months from the first filing date. This provides applicants with a chance to determine the commercial viability of the invention and allows them ample time to determine which individual countries would be of interest in terms of protection. The national filings based on a PCT application can be done at any time within the 30 or 31 months time frame, depending on commercial and legal needs which are assessed on a case by case basis. Where potential markets include non-PCT contracting states, such as Iraq, a complementary protection strategy should be adopted early in the process, including a convention filing under the Paris Convention within the 12 months period from the filing date of the first application.

For protection in the Gulf region, applicants have a first choice of filing a single GCC application which covers all the GCC states, within 12 months of the first filed application, or pursue an application in each individual country after 30 months via the international PCT route. The GCC is not a signatory to the PCT, therefore a single GCC application cannot be filed via the PCT route. Usually a single GCC application filed in parallel to an international PCT application is the most cost-effective means of obtaining patent protection in the GCC region, particularly because a GCC patent is the only effective way to seek patent protection in certain countries such as Kuwait. National Kuwait patent applications are not currently examined and granted since the implementing regulations of the Kuwait patent law have not yet been adopted. A GCC patent application can also co-exist with national patent applications in the GCC countries which can also be considered, depending on the filing and protection strategy.

Once patent protection has been granted, it is important for each company to evaluate how to best commercialise the technology. This can include self use and/or technology transfer. Technology transfer can entail a lump sale of patent rights, or different licensing agreements, including exclusive or non-exclusive license rights to various third parties in the industry. Commercialisation or successful proprietary self use provides the company with means to exploit the financial advantages provided by the patent.

Conclusion

The general consensus among oil and gas companies is that the industry is at a critical juncture and it is imperative that NOCs in the Gulf region go beyond merely acknowledging the necessity to innovate and start executing upon this vision in a systematic way to ensure their long-term survival in a volatile market. Investing in R&D and developing targeted IP strategies are paramount to achieving this vision.

The global upstream oil and gas industry is projected to spend in excess of \$1.6 trillion by the end of 2016.

A considerable part of the upstream spend is in the development and introduction of new technology and ideas. Innovation is not simply down to the traditional measure of dollars spent, but also how that investment is implemented and administered. NOCs need to develop and foster innovation strategies that take into account factors such as geography, service models and their own production challenges, as there is no single solution that fits all company models.

Even in a growing market, companies face market volatility and ever-changing technical challenges, which can have a major impact on their ability to find and produce oil competitively. Increased focus on R&D and strategic processes for recognising, protecting and commercialising IP can provide a buffer from market downturns and help companies, and particularly NOCs, to become industry leaders and compete on an international level.