

Analysis of Oil and Gas Industry in Asia with Reference to Investment and Expansion Strategies of Asian National Oil Companies (ANOC's)

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Abstract

Demand for crude oil and natural gas in the Asian region has increased over the past few years at a rate of 1.3% during 2000-2012 and the demand for natural gas is likely to increase at an average annual growth rate of 6.8% during 2009-2020. Scarcity of resources forced many Asian National Oil Companies (ANOCs) to explore the opportunities in various corners of the world looking for prospective lands and partnerships which led them to aggressively invest in global acquisition of oil and gas assets. This paper deals with the strategies adopted by the ANOCs to secure their energy needs and conducts an in-depth analysis of Asian Oil and Gas industry. It also analyses the investments, mergers & acquisitions and growth strategies of major ANOCs. Results of the study show that increasing domestic needs have driven ANOCs' decision to expand overseas. It can be concluded that acquiring of assets internationally will play a prominent role in ANOCs' future operations.

Key words: Crude oil, Natural gas, Energy needs, Mergers, Acquisitions.

1. Introduction

Oil is the urgent need and gas is the future fuel for any nation. Energy in the form of either gas or oil is very critical for growth for all countries. Realizing this, governments across the world started actively participating in production and distribution of oil and natural gas which lead to the establishment of national oil companies referred to as NOCs (Tordo et al., 2011). Though most of the global oil business was controlled by the privately owned western oil companies, the Asian NOCs have become major players in the world oil and gas trade after 1950 (*ibid*). Over the past decade, the Asian region has seen a rapid increase in energy consumption. The growth in demand has been primarily driven by the economic growth in the Asian countries especially India and China (International Energy Outlook, 2013). During 2000 to 2008, China's oil consumption increased by over 1.7 times (from 4.7 million barrels to 8.0 million barrels per day), at an average annual growth rate (AAGR) of 6.5%. On the other hand, India's oil consumption too increased from 2.2 million barrels per day to 2.9 million barrels per day during 2000 to 2008, at an AAGR of 3.1% (IEEJ: November, 2010).

2. Literature review

Currently, India produces little above 110 million metric standard cubic meter per day (mmscmd) of gas, of which more than half is consumed by the power and fertilizer sectors (Indian Petroleum & Natural Gas Statistics, 2013). Indian Petroleum and fertilizer ministries have projected a need for 167 mmscmd of gas by 2016-17 which calls for increasing the gas supply either through domestic production or sourced from foreign markets in the coming three years (Banerjee, 2013). However, due to increase in domestic consumption and limited domestic supplies, the Asian region becomes more dependent on imports to fulfill its energy needs. The expected increase in both crude oil and natural gas consumption will drive the national oil companies of the region to look for opportunities globally in order to secure their future energy needs (Howell et al, 1993).

According to BP Energy Outlook 2035 (published in January 2014), global demand for oil is increasing at a yearly rate of more than 2%. Over the past few years, the Asian region has witnessed a colossal increase in crude oil and natural gas demand. The crude oil consumption increased at an Average Annual Growth Rate (AAGR) of 1.3% during 2000-2012 (Energy Statistics, 2013) and natural gas demand is likely to increase at an AAGR of 6.8% during 2009-2020. Scarcity of resources has forced many national oil companies to explore the areas which they had ignored for years and this exploration lead them to every nook and corner of the world looking for prospective lands and partnerships (Campbell, 1996). Since 1985, use of energy has increased by about 30%, 40% and 50% in Latin America, Africa and Asia respectively (Collin & Jean, 1998). The Energy Information Administration forecasts that worldwide demand for oil will increase 60% by 2020 (Campbell & Laherrère, 1998).

Asia's growing dependence on crude oil and natural gas imports has fuelled more overseas upstream acquisitions

by ANOCs to secure long-term energy needs (Moody's, 2014). National oil companies of India also started overseas acquisitions which made the country one of the important players in the global energy sector (McKenna et al., 2006). NOCs from India (ONGC, IOC and Reliance) made their investments across the globe in almost five continents (Herberg, 2007) as they are convinced that the economy depends heavily on oil-based energy (Campbell, 1997). Further, technically it is a known fact that the global exploration of oil and gas reserves will help the petroleum companies to increase success rate and mitigate risk (Tissot, 1978).

3. Statement of problem

How the ANOCs are making the cut above the rest in this extremely competitive world of oil and gas is the problem which will be explored in this study.

4. Objectives

The current research was undertaken to achieve the following objectives:

- To understand the need for foreign energy supplies in the Asian region.
- To understand the critical factors contributing to the global expansion of ANOCs.
- To critically evaluate the role of ANOCs in the global Merger and Acquisition activities.
- To evaluate the role of domestic governments in expansion of ANOCs.
- To analyse the investment and growth strategies of major ANOCs.

The discussion is based on extensive literature review. Following text makes objective-wise presentation of the findings.

4.1 Objective 1

First objective of the current research was to understand the need for foreign energy supplies, as the Asia-Pacific region has been struggling with its low indigenous resources of oil and gas (Wu, Kang et al., 2008). According to Fattouh & El-Katiri (2012) whose calculations were based on BP-2012, Asia-Pacific region accounts for just 2% of the total oil reserves in the world and hence heavily depends upon the rest of the world to fulfill its oil needs (Figure 1). During 2000-2008, China's oil reserves decreased from 17.9 billion barrels to 15.5 billion barrels at an AAGR of -1.9%. Among other Asian countries, Indonesia's production fell at an AAGR of -3.9% (EIA, 2011).

The rapid pace of economic development in India and China led to a huge increase in crude oil consumption in Asia. The consumption of crude oil in Asia increased from 20.1 million barrels per day to 24.2 million barrels per day during 2000 to 2008, at an AAGR of 2.3%. The consumption is expected to continue to increase at an AAGR of 2.5% during 2008-2020, reaching 33 million barrels per day in 2020. However, the production in the region will not keep pace with the growing consumption making the region more dependent on imports to fulfill its energy needs. For example, Asian countries increased crude oil production from 7.0 million barrels per day to 7.3 million barrels per day during 2000 to 2008, at an AAGR of 0.5%. This rate of increase creates mismatch between the local consumption and local production. Though the production in the region will continue to increase reaching 8.0 million barrels per day by 2020, at an AAGR of 0.8%, still the growing gap between the production and consumption makes the region more vulnerable (Research and Markets, 2010). Thus it can be understood that the increase in domestic demand coupled with the problem of limited resources in the region has led to an increased dependence on imports. According to EIA-China (2014), the import of crude oil in the region is expected to increase from approximately 70% to 76% during 2000 to 2020. Figure 2 presents the increasing demand-supply gap of natural gas in the Asian region, resulting huge imports even though domestic production continues to increase. Thus it can be concluded that the ANOCs are forced to depend upon the foreign energy supplies to meet their domestic markets' fuel needs.

4.2 Objective 2

Second objective of the current research was to understand the critical factors contributing for the global expansion of ANOCs. An analysis of data related to the oil and gas consumption of Asia reveals that the increasing domestic oil needs is a major factor in driving national oil companies to expand overseas. Over the past decade, the Asian region (especially India and China) has seen a rapid increase in energy consumption (Asia/World Energy Outlook, 2010). During 2000-2008, China's oil consumption increased by over 1.7 times from 4.7 million barrels in 2000 to 8.0 million barrels per day in 2008, at an AAGR of 6.5%. India's oil consumption increased drastically during 2000 to 2008 from 2.2 million barrels to 2.9 million barrels per day at an AAGR of 3.1% (OECD/IEA, 2011).

During 2009-2020, the crude oil consumption in the Asian region is expected to increase at an AAGR of 2.6%, with most of the increase in demand coming from India and China. While China's crude oil consumption is expected to increase at an AAGR of 5.1% to reach 14.6 million barrels per day, India's crude oil consumption is expected to increase at an AAGR of 3.7% to reach 4.5 million barrels in 2020 (Energy Outlook, 2013). Along with crude oil, the natural gas consumption in the region is also expected to increase at a faster pace (at an

AAGR of 4.5% during 2009-2020). Including India and China, countries such as South Korea and Japan too witnessed a steady increase in natural gas consumption over the past years, increasing at an AAGR of 7.9% and 3.2% respectively. However, during 2009-2020, China and India will play a major role in this increase (*ibid*). Thus, increasing domestic needs and limited domestic supplies have forced ANOCs to expand overseas in order to secure their long term energy requirements. For this purpose, the Asian national oil companies have been aggressively looking to expand their operation across the globe, driven by national priorities. Though the ANOCs were more concerned about their domestic need fulfillment and their own survival, their pursuit of global expansion strategies made them major players in the world oil and gas industry. And with this encouragement, they are now looking to further expand their foothold internationally. Hence, it can be said that increased domestic supply demand gap is the most critical factor which compelled ANOCs to expand globally.

4.3 Objective 3

Third objective was to critically evaluate the role of ANOCs in the global merger and acquisition (M & A) activities. Available secondary data in the form of global reports and articles (Asia/World Energy Outlook, 2010; Bentley, 2002; BP Energy Outlook-2035, January 2014; EIA Report, 2011) clearly mentions that the ANOCs have been aggressively looking to strengthen their foothold globally by targeting acquisition of smaller companies which have operations in major producing regions. These acquisitions allow ANOCs to expand their operations to major producing regions globally (Odell, 1997). Recent acquisition of Addax Petroleum in Nigeria by Sinopec from China allowed the company to enter into Iraq's lucrative oil and gas industry (OECD/IEA, 2011). All the major acquisitions by the Asian NOCs during the past years have been directed towards entering into a new producing region by acquiring smaller companies operating in the high oil producing regions (*ibid*).

During 2005 to 2009, various ANOCs increased their participation in the global M&A activities. More than US \$ 48.8 billion was spent during 2005 to 2009 through 59 different deals (excluding the asset swaps between Petrochina and China National Petroleum Corporation (CNPC)) to acquire companies as well as Exploration & Production (E&P) assets abroad (OECD/IEA, 2011). Chinese NOCs have been relatively most aggressive, spending almost US \$ 26.6 billion for acquiring foreign properties, followed by Korean NOC that has spent over US \$10.5 billion in the past few years. Chinese NOCs together featured in seven of the top 10 deals during 2005-2009. From Table 1 that presents the top 10 M&A and asset transaction deals by ANOCs during 2005-2009, it can be noticed that all activities are by either Chinese or Indian ANOCs (Research and Markets, 2010).

Acquisition of Addax Petroleum by Sinopec for US \$ 7.53 billion, the largest among all, has strengthened the company's position globally by adding new assets to its portfolio in Nigeria, Gabon and the Kurdistan Region of Iraq (www.addaxpetroleum.com/operations/nigeria). CNPC's acquisition of PetroKazakhstan was the second biggest deal during the period with CNPC paying US \$ 4.18 billion to acquire prospective assets in Kazakhstan (The Moscow Times, 23 Aug, 2005). China's CNPC has operations in 8 different countries in Asia namely, Azerbaijan, Indonesia, Kazakhstan, Mongolia, Myanmar, Thailand, Turkmenistan and Uzbekistan. The company's first major acquisition in the region was the acquisition of PetroKazakhstan for US \$ 4.18 billion in 2005. CNPC's second major acquisition was in April 2009 when the company, together with KazMunaiGaz, acquired Mangistaumunaigaz for a purchase consideration of US \$ 3.3 billion (Zhao, Suisheng, 2008).

India's national oil company, ONGC currently operating in China, Myanmar and Vietnam (Economic Times, 7th May, 2014), is also trying to expand its operations in the region. ONGC recently also entered into an agreement with KazMunayGas, National Oil Company of Kazakhstan to acquire 25% interest in the Satpayev exploration block in Kazakhstan allowing the entry of this ANOC into the one of the major oil and gas reserves producer in central Asia (KazTransOil, press release, 25 Sep, 2012). ONGC Videsh considerably increased its operations in Russia with the acquisition of Imperial Energy in 2008 (Source: www.ongcvidesh.com). Malaysian NOC, Petronas' operations in the area expand into Australia, Indonesia, Myanmar, Timor Leste Joint Petroleum Development Area (JPDA), Turkmenistan, Uzbekistan and Vietnam (Petronas media release, 2012).

Most of the past acquisitions in Africa were through acquiring exploration licenses rather than assets of companies (Research and Markets, 2010). The entry of ANOCs in Africa has been more through participation in bidding rounds rather than acquisition of properties. However, in coming years it is expected that the acquisition of smaller companies will prove to be a better way of expanding operations in the region. With governments' backing and strong financial capability, the Asian NOCs will look for acquisition of developed assets rather than prospecting licenses (Patey, 2006).

4.4 Objective 4

Fourth objective of the current research was to evaluate the role of domestic governments in expansion of Asian NOCs. The Asian national oil companies' overseas investments are part of their countries' wider thrust into the world economy and are most of the times supported by their respective governments, not only for securing future energy needs but also for increasing bilateral economic and political relations (The Economist, 2013). Aggressive expansion strategies can, not only be linked to their need for securing oil and gas supplies for the home country but also to the commercial motivation which has played an important role in their overseas investment drive. These NOCs are increasingly behaving and investing in similar ways to that of commercial

international oil companies. However, the domestic governments continue to hold a major influence over their national oil companies. The domestic priorities still continue to be the prime driver of the growth strategies of these companies. While, the Indian government has backed the ONGC Videsh Ltd.'s expansion overseas, the Chinese government announced its intent to fund its national oil companies overseas oil acquisitions. Further, China also provided a low interest US \$ 30 billion loan to China National Petroleum Corporation to finance its overseas acquisition (The New York Times, 9th September, 2009).

The Korean government in 2008 announced a plan to boost KNOC's overseas assets by pumping US \$ 4 billion to expand KNOC's size. The Korean government plans to achieve an oil-and-gas self-sufficiency ratio to 10% or higher in 2010, eclipsing its previous target of 9.1%. At the end of 2009, the ratio stood at 8.1% (Byul-hwa, 2009). An excellent example of growing support of the domestic government to the national oil companies enabling them to expand overseas is the Chinese government's recent strategy of loan for oil agreements. In 2009, the Chinese government signed loan for oil agreements with many major oil producing countries across the globe in order to secure the country's long terms energy needs. In total, Chinese government has spent approximately US \$ 45 billion in different loan-for-oil agreements. These agreements will enable the country to have steady oil supplies for the next 20 years (OECD/IEA, 2011). Chinese government's deal with the Kazakh government for a 50% stake in Mangistaumunaigaz (MMG) is another good example of role of local government in expansion of NOC's (Mohamedi, 2009).

With energy being the center point of growth for all countries, these NOC-to-NOC partnerships also tend to strengthen the economic relationships between nations. The national governments will play a major role in these NOC-to-NOC partnerships in the coming years. The above mentioned example of Chinese government's loan for oil agreements can be quoted here as an example of the increasing role of the local governments in promoting the cooperation between national oil companies. Thus, the Asian national governments have been helping the NOCs through financial support to assist them in their overseas acquisitions and also using their own diplomatic tie up to increase the domestic NOCs' exposure into major producing regions.

4.5 Objective 5

Fifth objective of the current research was to analyse the investment and growth strategies of major ANOC's. It would be appropriate to start this section with the study of Chinese NOCs that attempted to secure China's future energy supplies (Bentley et al, 2000). The fast growing crude oil and natural gas demand in China has driven the Chinese NOCs to expand their operations abroad. All the major NOCs in China namely CNPC, Sinopec and CNOOC have been aggressively acquiring assets across the globe. Though the Chinese NOCs have been acquiring oil and gas properties over the past years, the activity picked up significantly in 2008-2009 (Schüller et.al, 2005). The Chinese national oil companies backed by their government have managed to take advantage of the tight credit market and global economic slowdown, looking for new opportunities for acquisitions. In addition to various acquisitions during the year, the Chinese NOCs signed various agreements with major oil and gas producers during 2009, in order to secure the domestic country's future energy supplies (EIA China, 2014). During 2008 and 2009, the Chinese national oil companies together were involved in asset transaction or company acquisition in 11 major deals, with Sinopec's acquisition of Addax Petroleum for US \$ 7.5 billion being the largest of deal followed by CNPC's acquisition of Mangistaumunaigaz for US \$ 3.3 billion. The Chinese NOCs together spent over US \$ 17.8 billion during the past two years in acquiring properties abroad (E & P Database, 2010).

The Indian National Oil Companies too started looking for avenues to expand their businesses to global platforms (Keun-Wook et al., 2007). The overseas acquisition of Indian national oil companies have been lead by ONGC's foreign arm OVL (ONGC Videsh Limited). ONGC Videsh has operations in 19 different countries worldwide (excluding joint development areas) and has been quick to acquire new oil and gas assets across the globe. Currently, the company is working as operator in 17 projects and joint operator in 5 projects (The New York Times, 9th September, 2009). Even though OVL has taken the lead in terms of overseas expansion, the other NOCs in the country namely IOCL (Indian Oil Corporation Limited), BPCL (Bharat Petroleum Corporation Limited), HPCL (Hindustan Petroleum Corporation Limited and OIL (Oil India Limited) are also looking for opportunities to acquire oil and gas properties abroad.

Further to mention, South Korea, the fifth largest net importer of oil in the world relies on imports for all of its oil needs. In order to secure its future energy needs, South Korean government has unveiled a plan to enhance up the competitiveness of KNOC. According to the new plan that was unveiled in June 2008, KNOC starts focusing on purchase of oil fields along with acquisition of foreign oil development projects. The Korean Government aims to triple KNOC's assets by 2012 (Herberg, 2007). The largest acquisition by the company is its acquisition of Harvest Energy Trust in October 2009. Harvest Energy is one of Canada's largest energy trusts with operations spread across to upstream oil and natural gas production and downstream refining and marketing operations. The deal will boost KNOC's crude oil output to 123,400 barrels a day from 70,000 barrels, moving it closer to its goal of raising daily production to 300,000 barrels by 2012. The acquisition came as a relief to KNOC, after it was outflanked by China Petrochemical Corp. trying to buy Addax Petroleum Corp., one of the

largest independent oil producers in West Africa and the Middle East (Jeon, 2011).

Petronas which is set to grow into a huge global oil and gas company has a diversified portfolio with operations across the value chain of crude oil and natural gas. The company has E&P operations across the globe and is strongly positioned to play a major role in the global energy industry. The company has fast expanded its operations internationally with the share of international production increasing from 23% in 2003 to 35% in 2008 (World Investment Report, 2013). The company has steadily increased its international operations to compensate for the decreasing domestic production. During 2008, the company successfully secured 13 new ventures abroad during the year, bringing the number of international ventures to 63 in 23 countries. The company continued to expand its international operations during 2009. Petronas acquired 20% interest in two oil blocks from ExxonMobil Oil Indonesia and also further increased its share in Cairn India, a company involved in exploration and production activities in India (Global oil and gas transactions review, 2013).

5. Practical Implications

Oil is the lifeblood of not only a nation's economy but also world's economy. Oil is critical for growth of the economy because it provides the cheap energy for transport, fertilizers, power and agriculture. Oil was one of the main factors because of which there was economic prosperity and growth that the World has enjoyed for the past 100 years and more.

6. Conclusions

Asia-Pacific region accounts for just 5.6% of the total oil and gas reserves in the world, thus heavily depends upon the rest of the world to supply its oil needs. The rapid pace of economic development in India and China led to a huge increase in crude oil consumption in Asia. The crude oil consumption is expected to increase at an AAGR of 2.5% during 2008-2020, reaching 33 million barrels per day in 2020. Increasing domestic demand and limited resources in the region led to an increased dependence on oil imports. The Asian region's dependence on import of crude oil is expected to increase from approximately 70% to 76% during 2008 to 2020. The growing dependence on foreign oil will drive the national oil companies of the region to expand their operations in order to secure the future energy needs of the domestic country. The share of natural gas in Asia's energy mix has been steadily increasing with the growing concern over climate change. Natural gas consumption in Asia is expected to increase at an AAGR of 4.5% during 2008-2020 to 24,603.3 Billion cubic feet (Bcf) in 2020. It can be concluded that the rapid increase in natural gas consumption during 2008-2020 will make NOC's to increasingly depend up on imports (from 5% in 2008 to 20% in 2020).

Over the past decade, the Asian region has seen a rapid increase in energy consumption. During 2009-2020, the crude oil consumption in the Asian region is expected to increase at an AAGR of 2.6%, most of the increase in demand would come from India and China. The steady growth in domestic consumption has made it necessary for Asian national oil companies to expand their reserves and production base through expanding their operations internationally. The increase in both reserves and production of major Asian NOCs stands in contrast to the decrease in both reserves and production witnessed by most of the major international oil majors (IOCs) during the same period.

The Asian national oil companies have been aggressively looking to strengthen their foothold globally by targeting acquisition of smaller companies which have operation in major producing regions. The Asian national oil companies immediate task is to secure oil supplies as their nations' economies are heavily oil-dependent. The acquisition of these companies allows the NOCs to expand their operations to major producing regions globally. Different ANOCs have spent more than US \$ 48.8 billion during 2005-2009 through 59 different deals. China's CNPC has operations in 8 different countries in Asia. Africa has been one of the major areas of expansion for the Asian national oil companies with all the major Asian national oil companies having their operations in the region. ONGC Videsh is also an active player in Latin American countries. The Asian NOCs' investments in Europe are mostly concentrated in Russia with an exception of KNOC which has assets in the UK too. Asian NOCs are evolving from producing onshore conventional barrels to offshore un-conventional barrels by investing in technical service capabilities. Asian NOCs will have to extend their investment and strategic focus to offshore gas, shale gas and LNG. Asian NOCs need to invest heavily in R& D, expand in services capability, and transfer technical expertise to local development of resources.

The domestic governments have been helping the firms to acquire assets abroad to supplement domestic resources. With growing nationalization of resources, the NOCs of major producing countries also prefer these joint ventures. With energy being the center point of growth for all countries, these NOC-NOC partnerships also tend to strengthen the economic relationships between nations.

Most acquisitions by Chinese companies were associated with acquisition of E&P assets except for Petrochina's acquisition of Singapore Petroleum from Keppel, expanding the company's downstream operations in the region. The major acquisitions during the past two years have helped Chinese to diversify their portfolio and further expand their operational base. The different Chinese NOCs partnered with major IOCs to bid for oil blocks in

Iraq. Along with Chinese NOCs, Indian NOCs (IOCL, BPCL and HPCL) are also looking to extend their operation and enter into upstream business through acquiring properties globally. KNOC will continue to acquire foreign oil assets in 2010 towards reaching its crude oil output goal of 300,000 barrels a day by 2012. Petronas has acquired small companies and assets over the past years but has not been very active in terms of M&A activities. Oil is the pre-dominant investment now but this may shift to gas in the future due to changes in price, end user demand and availability of resources. Asian NOC's have evolved from players focused on production in domestic oil resources to become technical leaders in oil by International Mergers & Acquisitions. Vertical Integration could be the winning business model for companies with significant economies of scale as downstream players moving upstream and integrated players expanding throughout the value chain. Asian NOCs should leverage partnerships with private international companies.

7. Limitations of the Study

The study was limited to Asian National Oil companies only. The study is mostly based on secondary data. Economic conditions might have varied over time.

8. Scope for Further Research

Even though the world is not running out of oil, we all face soon, is the end of the copious and cheap oil on which all industrialized nations depend. Thus there is need for advanced research on exploring un-conventional oil reserves without extracting high environmental price.

References

- Asia/World Energy Outlook (2010), "The role of technology towards the resolution of energy and environmental issues in Asia", *405th Forum on Research Works, 1st Nov, 2010*, Tokyo, Japan.
- Banerjee, Soma (2013), "Where India went wrong in its gas pricing policies", *ET Bureau, Economic Times*, 9th July.
- Bentley, R.W. (2002), "Global oil and gas depletion: an overview", *Energy Policy*, **30**, 189-205.
- Bentley, R.W., Booth, R.H., Burton, J.D., Coleman, M.L., Sellwood, B.W., & Whitfield, G.R. (2000), "Perspectives on the future of oil, in Energy Exploration and Exploitation", *Multi-Science Publishing*, **18**, 147-206.
- BP Energy Outlook 2035 (January, 2014), Retrieved on 8th May, 2014 from www.bp.com/content/dam/bp/pdf/Energy-economics/Energy-Outlook/Energy_Outlook_2035_booklet.pdf
- Byul-hwa, Kim (2009), "KNOC's global expansion strategy", *IEEJ*, December.
- Campbell, C.J. (1996), "The status of world oil depletion at the end of 1995", *Energy Exploration and Exploitation*, **14**, 63-81.
- Campbell, C.J. (1997), "Better understanding urged for rapidly depleting reserves", *Oil and Gas Journal*, **95** (14), 51-54.
- Campbell, C.J., & Laherrère, J.H. (1998), "The end of cheap oil", *Scientific American*, **278** (3), 78-83.
- EIA (2011), "U.S. Energy Information Administration: Natural Gas Gross Withdrawals and Production", Retrieved on 15th April, 2014 from www.eia.doe.gov/dnav/ng/ng_prod_sum_a_EPG0_VRN_mmcf_a.htm
- EIA-China (2014), "US Energy Information Administration", US Dept. of Energy, Washington, DC. Retrieved on 5th May, 2014 from www.eia.gov/countries/analysisbriefs/China/china.pdf
- Energy Outlook (2013), "For Asia and the Pacific", October, 2013. Retrieved on 5th May, 2014 from www.igi.fisipol.ugm.ac.id/index.php/en/component/attachments/download/293
- Fattouh, Bassam & El-Katiri, Laura (2012), "Energy and Arab Economic Development", *Arab Human Development report*, Research paper series, 2012.
- Herberg, Mikal E. (2007), "The Rise of Energy and Resource Nationalism in Asia, in Asia's rising power and America's continued purpose", by Ashley J. Tellis, Andrew Marble, and Travis Tanner, *Strategic Asia 2010-11*, National Bureau of Asian Research, Washington, 113-142.
- Howell, D.G., Bird, K.J., & Gautier, D.L. (1993), "Oil: When will we run out?", *Earth*, **2** (2), 27-33.
- IEEJ: November (2010), "The role of technology towards the resolution of energy and environmental issues in Asia", *Asia/World Energy Outlook 2010*, The Institute of Energy Economics, Japan.
- Indian Petroleum & Natural Gas Statistics (2012-13), Government of India, Ministry of Petroleum and Natural Gas, Economic Division, December, 2013, pg.30. Retrieved from www.petroleum.nic.in/pngstat.pdf
- International Energy Outlook (2013), "With projects to 2040", US Energy Information Administration, US Dept. of Energy, Washington, DC. Retrieved from [www.eia.gov/forecasts/ieo/pdf/0484\(2013\).pdf](http://www.eia.gov/forecasts/ieo/pdf/0484(2013).pdf)
- Jeon, Sujin (2011), "Overseas oil development of South Korea", *IEEJ*, February.
- Keun-Wook, P., Valerie, M., Glada, L., John, VM.. & Erkin, A. (2007), "Trends in Asian NOC Investment Abroad", *Energy, Environment & Development Program*, Chatham House.
- Marcel, Valerie (2006), "Oil Titans: National Oil Companies in the Middle East", *Brookings & Chatham House/Brookings Institution Press*, Washington, D.C, USA.
- McKenna, Matthew, Wilczynski, Herve and VanderSchee, David (2006), "Capital Project Execution in the Oil and Gas

- Industry: Increased Challenges, Increased Opportunities”, *Booz Allen Hamilton*, Virginia, USA.
- Mohamedi, Fareed (2009), “China: a new model in overseas oil strategy”, *PFC Global Risk*, September, 11. Retrieved on 11th May, 2014 from www.china.org.cn/opinion/2009-09/11/content_18509242.htm
- Moody’s (2014), “Oversupply will cool oil prices in 2014: US midstream stays healthy”, *Global Credit Research - 06 Jan 2014*. Retrieved from www.moodys.com/research/Moodys-Oversupply-will-cool-oil-prices-in-2014-US-midstream--PR_290087
- Odell, P.R. (1997). “World oil resources, reserves and production”, *The Energy Journal (IAEE)*, **15**, 89–113.
- OECD/IEA (2011), “Overseas Investments By Chinese National Oil Companies Assessing the drivers and impacts”, February. Retrieved on 10th May, 2014 from www.energianews.com/newsletter/files/8cc4d5d6b70eea5e72502ef1c50ce5fe.pdf
- Patey, A Luke (2006), “A complex reality: The strategic behaviour of multinational oil corporations and the new wars in Sudan”, *Danish Institute of International Studies Report*, March. Retrieved on 8th May, 2014 from www.diis.dk/graphics/Publications/Reports2006/lpa_complex_reality_sudan.pdf
- Petronas media release (2012), “Petronas Discovers Gas Offshore Sarawak”, *Media Relations Department*, 13th February.
- Research and Markets (2010), “Asia National Oil Companies: Overseas Acquisitions To Secure Future Energy Needs”, January, 2010, 72 pages.
- Schüller, Margot & Turner, Anke (2005), “Global ambitions: Chinese companies spread their wings”, *Im Fokus, China aktuell*, **4**, 3-14.
- Stewart, D.W., & Kamins, M.A. (1993), “Secondary research: information sources and Methods”, 2e, *Sage publications*, California, USA.
- Swaminathan (2013), “Scrap Ranga, Decontrol Gas”, Retrieved July 17th, 2013 from www.economicstimes.indiatimes.com
- The Economist (2013), “The global oil industry”, *Supermajordämmerung*, 3rd August.
- The Moscow Times (2005), “Chinese to Pay \$4.2Bln for PetroKazakhstan”, Retrieved on May 7th, 2014 from www.themoscowtimes.com/business/article/chinese-to-pay-42bln-for-petrokazakhstan/210434.html
- The New York Times (2009), “Chinese Oil Company Gets \$30 Billion Loan for Acquisitions”, 9th September. Retrieved on 20th Dec, 2013 from www.nytimes.com/2009/09/10/business/global/10oil.html?_r=0
- The Rise of Asia’s National Oil Companies: Competitive Issues and Geopolitical Implications. Retrieved October 11, 2013, from www.boozallen.com/
- Tissot, B.P., & Welte, D.H. (1978), “Petroleum formation and occurrence: a new approach to oil and gas exploration”, *OSTI publications*, USA.
- Tordo, Silvana, Tracy, Brandon S. & Arfaa, Noora (2011), “National oil companies and value creation”, *World Bank working paper 218*. Retrieved from www.elibrary.worldbank.org/doi/pdf/10.1596/978-0-8213-8831-0
- World Investment Report (2013), “Global value chains: Investment and trade for development”, Chapter 1, *Global investment trends*, 1-36.
- Wu, Kang; Fesharaki, Fereidun; Westley, Sidney B. & Prawiraatmadja, Widhyawan (2008), “Oil in Asia and the Pacific: Production, Consumption, Imports, and Policy Options”, *Asia Pacific Issues, Analysis from the East-West Center*, **85**, August.
- Zhao, Suisheng (2008), “China's Global Search for Energy Security: cooperation and competition in the Asia-Pacific”, *Asia-Pacific Journal: Japan Focus*, **Issue 49**, pg. 4.

Websites

www.aoc.co.jp
www.addaxpetroleum.com
www.cnpc.com.cn
www.knoc.co.kr
www.kogas.or.kr
www.moodys.com/
www.oilindia.nic.in
www.ongcvidesh.com
www.petronas.com.my

Figure 1: World oil reserves by region at the end of 2011

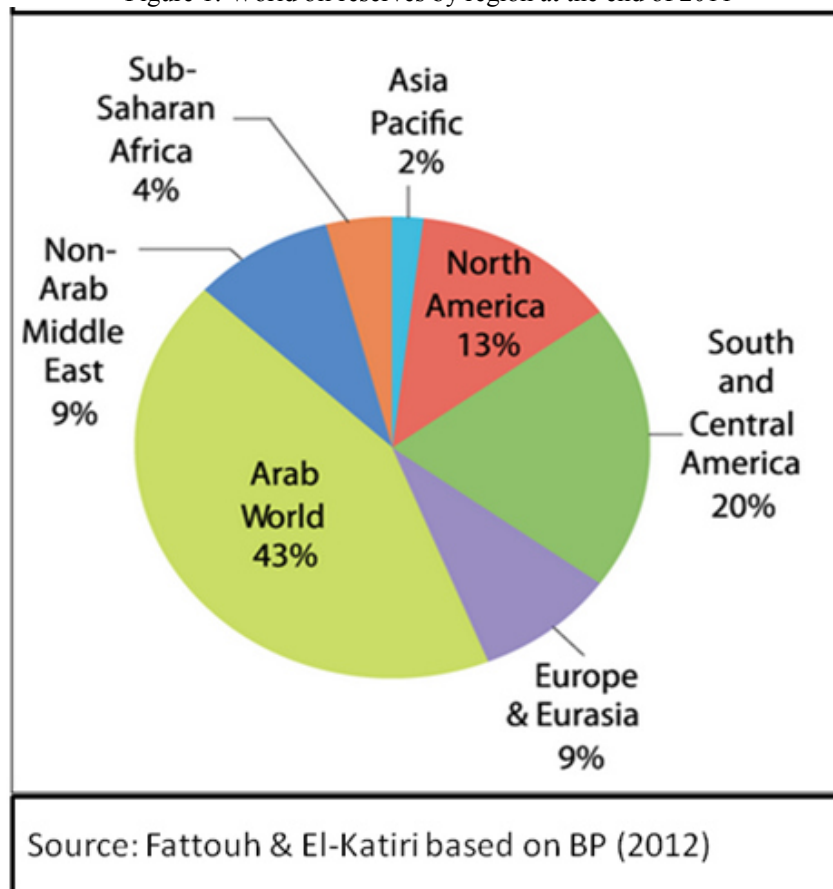


Figure 2: Increasing demand-supply gap of natural gas in Asia – 2000 to 2020

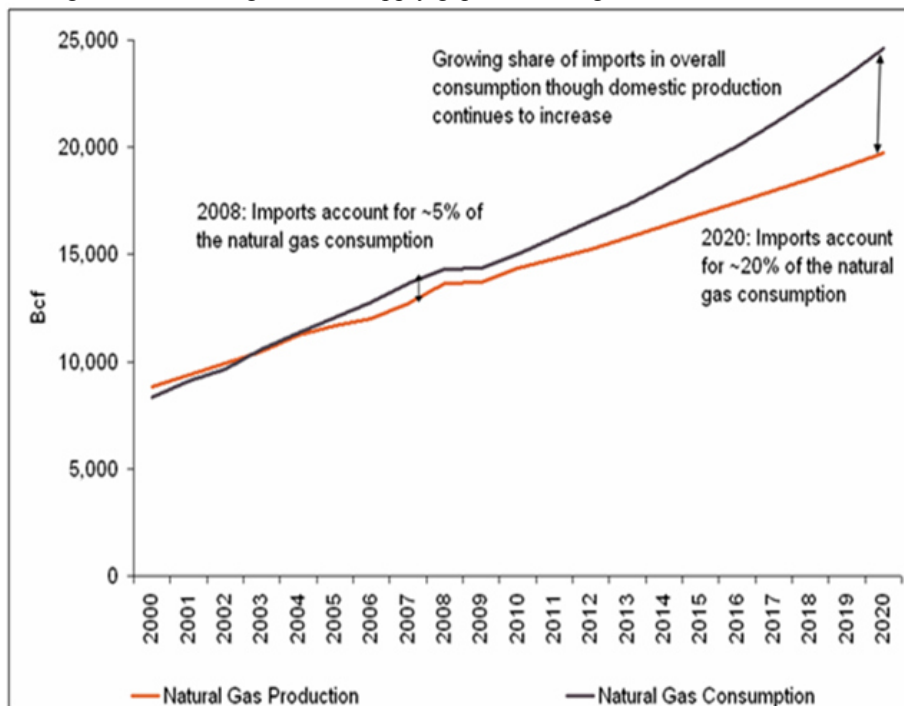


Table 1 : ANOC's top deals of M&A's during 2005-2009 (by Deal-Value)

Particulars	Deal Value (US \$ ml.)	Announced Date
Sinopec acquires Addax Petroleum	7,533.3	Jun-09
CNPC International acquires PetroKazakhstan	4,180.0	Aug-05
Korea national oil company acquires Harvest Energy	3,900.0	Oct-09
China National Petroleum And KazMunaiGaz acquires Mangistaumunaigaz from Central Asia Petroleum	3,300.0	Apr-09
China Petroleum & Chemical acquires Udmurtneft from TNK-BP	3,100.0	Jun-06
China National Offshore Oil Corporation (CNOOC) acquires 45% working interest in an offshore oil mining license from South Atlantic Petroleum	2,692.0	Jan-06
Petronas acquires 40% stake in Gladstone Liquefied Natural Gas Project	2,500.0	May-08
ONGC Videsh (from India) acquires Imperial Energy	1,890.0	Jul-08
Sinopec acquires Tanganyika Oil Company	1,871.7	Sep-08
PetroChina acquires 60% stakes in MacKayRiver and Dover Oil Sands Projects from Athabasca Oil Sands	1,741.5	Aug-09
* Excluding the asset swaps between Petrochina and CNPC		
Source: Compiled by the authors		

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