

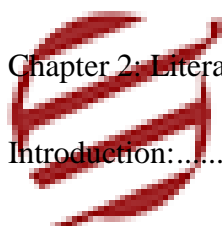
**AMERICA'S SHALE GAS REVOLUTION AND ITS GLOBAL
IMPACT**



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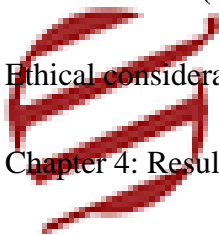
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Chapter 1: Introduction

Introduction:

In this present study the researcher deals with discussing the overall implication shale gas; its uses and misuses and the global revolution regarding the gas eruption. As the country undertaken to complete the research is America; the effectiveness of the shale gas project, its issues and the global impact of producing shale gas has a significant point of view. Among few of the natural resources of fuel, shale gas had enlisted its name recently. Although termed as ‘unconventional gas’, the issues remain in being shale gas not exactly extracted from the conventional manner yet is being used vastly as those (Kolb, 2013, p. 29).

Gunningham (2013, p. 304) had commented that the production of shale gas in America had created a new aspect in terms of ‘existing energy industry’. The Russian states and the Arab countries were the leader in natural gas production from the very day of inception and had remained so up to 21st century. In 2009-2010, as the unconventional source of shale gas had been introduced, the ‘petro-states’ had consecutively found their revenue sources weakened as the ‘global energy dependence’ shifted to America leading towards assessing the power distribution; that will significantly affect the security threats and energy markets creating a newer balance.

Rationale of the study:

As the study is relied upon the fact of comparing the natural gas resources those are at a time termed as conventional sources of energy; with the unconventional energy source, the shale gas. As the year 2010 had seen the maximum eruption of shale gas, the global market of gas and oil, commonly termed as power balance had introduced the revolution that had termed as shale gas revolution (Manning, 1993, pp. 59-61). Simultaneously, the United States

geological survey had highlighted shale gas with the following aspects that is again information to learn the advancements, applications and innovations. Being an American, rather North American product, shale gas has the capability to manage the geopolitics tie ups around the globe; among nations (Apga.org, 2015).

On the other hand, the effectiveness of using shale gas broadly met in the North American countries and the states. Therefore, the emerging countries with lesser fuel source or revenues floated to import fuel and gas has a new option as the shale gas revolution had provided them the path of creating a market lead by the American power users. However, Kotov and Urazmetova (2014, pp. 390-392) had stated the opinion of sharing the shale gas and the power house responsibilities withholds with American acts of managing single handed the energy market.

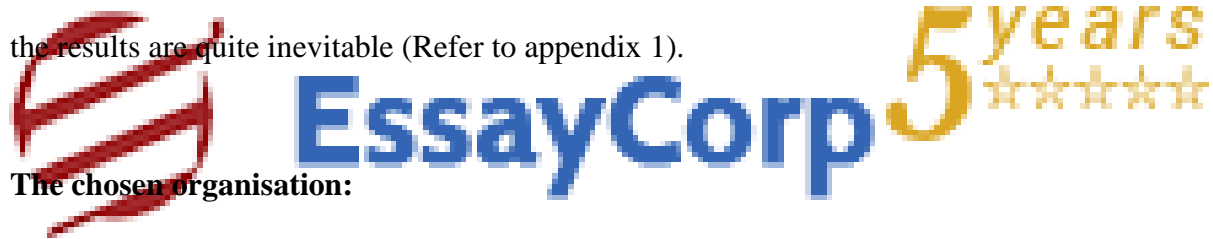
 **Background of the chosen industry:**

Fuel, oil and gas are the natural resources that make our daily life run. From our day start to end it or even not end at all as we use most of the gadgets and the other home and office equipments; all those runs with fuel at different forms--- electricity, gas or oil. Talking about the American conventional fuel industry, where an unconventional option had in these recent years had been incorporated, this study points out into taking an account of those to understand the industrial exploration (Stevens, 2010, pp. 49-50).

According to the studies of Wakamatsu and Aruga, (2013, pp. 1003-1004), the United States of America has an ample amount of source of natural gas and petroleum. However, the source was sufficient to serve the country itself as USA became the third largest oil and gas producer in 2008; Saudi Arabia and Russia being first and second respectively. The American fuel or petroleum industry however, is not sufficiently incorporated with the sources of fuel and gas and suddenly in this time, disgustingly 2010-2011, the unconventional gas source

introduced itself. Termed as shale gas, the gas was found trapped in a form of shale (Shaletec.org, 2015).

Therefore, the domestic and regular uses of gas and fuel produced by using the process of hydraulic fracturing and horizontal directional drilling, often also termed as fracking by (Stevens, 2010, pp. 49-50); had caused the path of revolution as this is the unconventional source of fuel. The traditional forms and sources of fuel ha now had saw a new competitor. Moreover, the oil and energy production, reservation and pricing strategy of the unconventional shale gas had pointed out the revolution (Stevens, 2010, pp. 49-50). One, through the production of fuel that is quite huge; and is able to moderate the second point of revolution-- pricing of the shale gas throughout the globe. As a consequence, this can be termed that as supply and chain is proportionate to one another, the cause of revolution and the results are quite inevitable (Refer to appendix 1).



The chosen organisation:

As the study incorporates the effectiveness of shale gas the industry in the United States, the need of more sources is a need; while on the other hand, more application of newer technologies of hydraulic fracturing and horizontal drilling is developing. Therefore, among the various offshore and onshore sources and operators those are providing the nation gas and fuel produced from shale gas, the researcher in this study had chosen the Barnett shale for having a better understanding of the project that is undergoing. Another effectiveness of choosing a particular reservoir or production unit is to have a clear and concise report while going through the data analysis part.

The Barnett shale is located in the Bend arch Fort Worth basin, discovered in 1980 and started production years later, in 1999. According to Kolb (2013, p. 29), this is one of the

largest reservoirs in the United States as the estimated gas production is 2.5×10^{12} cu ft (71 km³) and is ample for regular commercial uses.

Background of the research:

According to Bros, (2012, p. 98), shale gas is one of the option of being the low carbon fuel to the world that completely in these recent years was one of the most sought out answers by the geo-politicians. Because, there are, simultaneously, most gas and carbon emissions had happened that had caused enough damage to the globe and the environment itself. While on the other hand, lower carbon future seemed almost impossible as it is quite not feasible to stop the process of progress that is being run by fuel in general. Therefore, there lies the reason of saying that shale gas is one of the biggest revolutions that had happened to America. As Wakamatsu and Aruga, (2013, pp. 1003-1004) had termed in this context, that despite of the competitions and the global difference of opinion that are going to happen because of this revolution of shale gas mass production, and become a 'game changer to the global power play'.

Research aim:

The aim of this research is to identify the impact of shale gas, its production and reservation to meet the revolutionary need of carbon less fuels. Being the latest among the competitors of fuels, the extent to which shale gas had provided the option for marketed gas production is necessary to understand and the study puts an emphasis upon that. Again, in a larger context, though it is said that shale gas is able to account the rest of the world as it comes in terms of gas export; still there are confusion that states that the only part of this revolution is that shale gas is able to serve the USA itself only. In this context, the study also incorporates the terms of technical tools and techniques, i.e. hydraulic fracturing and horizontal drilling is also under consideration in this study to have better results.

Research objectives:

To investigate the hype of shale gas revolution thoroughly

To explore the global gas market for a better understanding for more options

To analyse the unconventional shale gas option and its feasibility

To identify the challenges in the global gas market while establishing shale gas as a feasible option

Structure of the dissertation:

In chapter one, the researcher had examined the shale gas basics while providing a thorough understanding about the gas market, the potential and the challenges as well. Illustrating the North American invention of the gas in an unconventional manner from the global gas market scenario is being presented for structure up the factors of demand and supply of the chains of gas supplies.

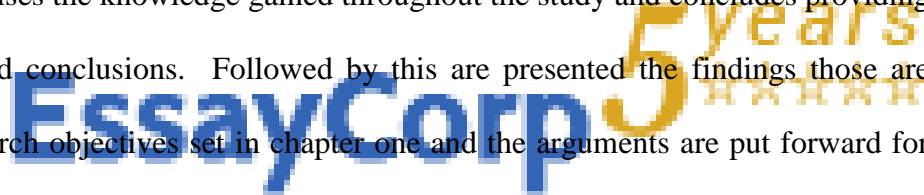
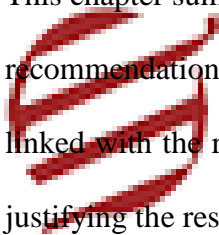
In the next chapter, chapter two, the literature had been described in a meticulous manner. Describing the international gas market with as much as statistics incorporates ample proves to understand scenario of traditional link of global energy structure. The provided material had been coupled with explaining the American scenario of gas uses and fuel emission and consumption. Therefore, this automatically leads forward to elaborate the recent gas revolution, the shale gas, the hype of it and the actual picture. In this chapter, the discussion also revolves around understanding the global picture of gas and its market. From discussing the revolution of gas, the pricing strategies, the competitors and the global impact of this revolution is minutely discussed in this chapter. Balancing the trade potential and the challenges, the other aspects of an industry setup and the investments, the economic and geopolitics power distribution had also provided with an extra emphasis in this chapter.

The third chapter discusses research methodology. The chapter includes a serial explanation of the methods, the research philosophy, the ample techniques, the research approach and the data collection method in a minute manner. Starting from discussing the research philosophy, research approach and research design, the study is followed by discussing the exact option of research modes necessary for completion of this particular study.

The fourth chapter discusses the data analysis and findings that is essential for meeting the research objectives through the primary and secondary research sources. Data collected from the sample, in this chapter aligns with problem and the analysis required resolving the research problems.

The fifth chapter is indeed the last chapter that deals with the conclusion part of the study.

This chapter summarises the knowledge gained throughout the study and concludes providing recommendations and conclusions. Followed by this are presented the findings those are linked with the research objectives set in chapter one and the arguments are put forward for justifying the research objectives those were preset.



Chapter 2: Literature review

Introduction:

The current literature criers out an extensive study related to shale gas revolution that had caused in the United States in the near future while the effectiveness of discussing this subject matter lies in analysing the impact on the overall gas market spread worldwide and the impact of that evolution in the market as well. Therefore, the following sections incorporate the brief yet informative element of the gas revolution that had happened due to the shale gas production in a huge manner.

Brief history of the global gas market:

According to Bros, (2012, p. 98), the natural gas is one among the very few sources that are provided by the Mother Nature to the human being and had helped in every manner for development and the process of civilisation had been totally a failure instead of this natural gas. As it comes to fuel consumption and the discussion incorporates natural gas, the option to discuss the natural gas a commodity cannot be missed. As the usability became more visible, the interplay of export and import among nations took an extra verge. The business incorporated in aspect with need while the power play affected the global market (Refer to appendix 2).

However, this being the conventional process, the natural gas is an option that was identified for both commercial and non-commercial use also became somehow a conventional commodity. This natural gas demand and supply chain had made the Arab counties and Russia the leaders in the global market. Aguilera and Radetzki, (2013, p. 79) had pointed out that in middle of all these years, the united states if America quite well aware about the situation had suddenly created the hype of unconventional gas source, shale gas. While it was

a well known fact that natural gas resources are continuously increasing the uses and the supply in unbecoming, the shale gas hype had hammered upon the needs and the global economy that was dependent upon the natural gas. America's point in this context was to provide the world a gas or fuel source that is low in carbon emission. On the other hand, the leading position in the global economy and impact upon the geopolitics was also quite lucrative (Refer to appendix 3).

Emphasising upon the history of America's gas market:

According to Apga.org, (2015), the natural gas market of USA is segmented between financial and physical market. However, the markets though are segmented into two parts, also runs through a complex process to manage any leakage in the process. (Refer to appendix 4). However, despite of this complex process, as mentioned in the studies of (Stevens, 2010, pp. 49-50), the natural gas has a lower price within the nation. This is because of the demand and supply chain that is matched with the system. In this context, it can be termed that the constant uses of natural gas in industrial, residential or in commercial sector had continuously increased. Moreover the lifestyle permits to use the natural gas uses to increase while the pricing strategy is maintained in a flat manner so that the uses of can be continued.

However, the price of gas in the United States had reduced due to the shale gas revolution. This is the option open to the users and the regular consumers to break the traditional consumption of natural gas and serve the global energy market (Beckwith, 2012, p. 45). Automatically, the effects had affected the gas market and the supply and demand chain of energy while pointing out to the business patterns so far and the required changes to meet the already changed competitive situations.

Simultaneously, the aspect of development and growth comes in a row as the United States of America had played as one of the key components to determine the competition. Qatar being one of the leading players in supplying the natural gas in liquid forms; mostly termed as LNG in the industry, the revolution of shale gas had focussed upon the control of America in the international trade market as the shale gas had created an industry that is serving within the country to improve employments and revenue generation at the same time (What was the federal role in starting the shale-gas revolution? 2014, p. 965). Therefore, the national, international and the trading aspect are served at a time by using the shale gas revolution and made the nation a 'swing supplier'.

The different aspects of conventional gas and unconventional gas:

As Manning (1993, pp. 59-61) had pointed out, the differences of conventional and unconventional gas remains in simply within the process of gas extraction or the production system into which the gas undergoes. It is a much known fact that the gas, i.e. natural gas is normally found underground and is available within the layers of soils a pool. The extractions of these gases are quite easier as they have a natural flow. Using this nature of gas, the conventional method of extracting gas had made them a natural resource of fuel and energy. On the other hand, as we come to discuss the unconventional gas and its several aspects of shale gas; the key difference lies in the process of extraction of shale gas from the layers of soil. It is a difficult process; as shale gas doe not comes into a pool unlike natural gas. Therefore, the rocks that play as culprits of extracting shale gas hamper the flow of the gas. Therefore, technical innovation and uses of newer techniques to drill and extract the gas from the rock had been introduced while more innovation options are always in demand (refer to appendix 5).

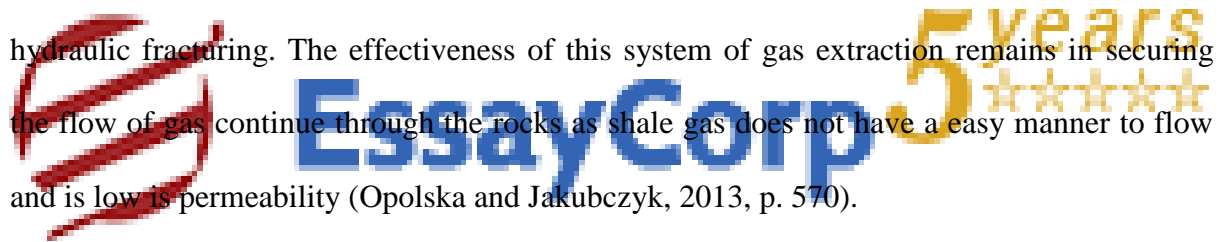
On the other hand, as the former sections of the study had discussed, as unconventional shale gas is termed as the only option for survival of near future, the development process the unconventional shale gas undergoes is to match the tremendous pressure around the globe to manage as a substitute of natural gas (Aer.ca, 2015). However, this being the conventional process, the natural gas is an option that was identified for both commercial and non-commercial use also became somehow a conventional commodity. The provided material had been coupled with explaining the American scenario of gas uses and fuel emission and consumption. Therefore, this automatically leads forward to elaborate the recent gas revolution, the shale gas, the hype of it and the actual picture. In this chapter, the discussion also revolves around understanding the global picture of gas and its market. From discussing the revolution of gas, the pricing strategies, the competitors and the global impact of this revolution is minutely discussed in this chapter. Balancing the trade potential and the challenges, the other aspects of an industry setup and the investments, the economic and geopolitics power distribution had also provided with an extra emphasis (ChemViews, 2013, p. 20).

The technical incorporation:

As discussed in the previous sections of the study, differences of conventional and unconventional gas remains in simply within the process of gas extraction or the production system into which the gas undergoes (Opolska and Jakubczyk, 2013, p. 570). It is a much known fact that the gas, i.e. natural gas is normally found underground and is available within the layers of soils a pool. The extractions of these gases are quite easier as they have a natural flow. Using this nature of gas, the conventional method of extracting gas had made them a natural resource of fuel and energy. On the other hand, as we come to discuss the unconventional gas and its several aspects of shale gas; the key difference lies in the process

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Therefore, the use of *hydraulic fracturing and horizontal directional drilling* had come into consideration to extract shale gas with lower emphasis and generate the most amount of gas. As it comes to drilling, the method is used to increase the amount of gas extracted except from the conventional method. The drilling are done in several ways- to drill down is one; while horizontal drilling had proved itself as the most helpful option to get the shale gas out from the rock. Another available technique to extract shale gas from the soil and rock layers, the hydraulic fracturing. The effectiveness of this system of gas extraction remains in securing the flow of gas continue through the rocks as shale gas does not have a easy manner to flow and is low is permeability (Opolska and Jakubczyk, 2013, p. 570).



Analysing the developmental aspects of unconventional gas in the United States:

The developmental aspects of unconventional gas in the united state had offered a complete different set of issues regarding 'energy environmental and policy issues' Wakamatsu and Aruga, 2013, pp. 1003-1004As discussed in the previous sections of this study, the shale gas revolution had been discussed in a detailed manner. As the study had pointed out the development of an alternative source of energy and fuel; the consequences underlies with the aspects of profitability. Simultaneously, the aspect of profitability automatically leads forward to manage the governmental policies, the entrepreneurship acts, as these aspects had impacted the most in securing the boom of unconventional shale gas (Gunningham, 2013, p. 304).

While the conventional gas had provided the American state economy a significant rise, as the shale gas had introduced itself, the year 2000 saw an integrated development of 1.6 percent of the total economy. This raised quite quickly as the next of the years had saw by 2010, a rise of 23.1 percent and the percentage had served the economy well (Beckwith, 2012, p. 45). This, being information of the growth, aspects like market structure, market leaders and the geopolitics situation also had served to consider the developmental aspects. In consideration with this, the United States of America had seen a completely unique industrial development that had stroking called itself ‘the hale gas boom’.

Shale gas revolution:

Other than the conventional sources of gas fuel and oil—the shale gas is the unconventional method of providing the nation and the international market another option to continue the civilisation. What was the federal role in starting the shale-gas revolution? (2014, p. 965) is a journal that had illustrated in the study that the differences of conventional and unconventional gas remains in simply within the process of gas extraction or the production system into which the gas undergoes. Using this nature of gas, the conventional method of extracting gas had made them a natural resource of fuel and energy. On the other hand, as we come to discuss the unconventional gas and its several aspects of shale gas; the key difference lies in the process of extraction of shale gas from the layers of soil. It is a difficult process; as shale gas doe not comes into a pool unlike natural gas. Therefore, the rocks that play as culprits of extracting shale gas hamper the flow of the gas. Therefore, technical innovation and uses of newer techniques to drill and extract the gas from the rock had been introduced while more innovation options are always in demand (Kotov and Urazmetova 2014, pp. 390-392).

It is a much known fact that the gas, i.e. natural gas is normally found underground and is available within the layers of soils a pool. The extractions of these gases are quite easier as they have a natural flow. However, Gunningham, (2013, p. 304) had argued by saying that though the United States of America has claimed to become the leader by providing the shale gas, it cannot be completely trusted. The fact lies in taking a toll upon the energy market strategy and in becoming a major part in the geopolitics. Already as they are serving the global market with the natural gas source and one of the leading sources after Russia and the middle eastern countries; now serving the shale gas as another source of energy would definitely shuffle the company strategy, the term revolution is therefore a hype, as stated by (Melikoglu, 2014, pp. 462-463). As the prospect of geographical location, the competitive advantage and the individual operators who earn a handful amount of revenue from the market are benefitted.

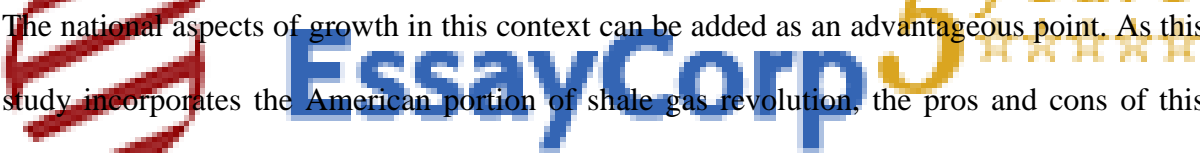
On the other hand, this point had been discussed by (Beckwith, 2012, p. 45), saying that the conventional mode of fuel is a necessity and in these days responsible for global disrupt of pollution and other environmental issues. Therefore, a lesser carbon emission is always welcomed in the geopolitics sessions. The unconventional shale gas had in this context therefore established this issue less disturbing.

Growth prospects in the national and international gas market:

The growth prospects of shale gas in the national and international aspects are quite diverse. Melikoglu, (2014, pp. 462-463) had pointed out that along with the national contexts, the international aspects of pricing strategy and energy market will quite be affected by the shale gas revolution. As gas and oil is considered as golden sources of energy, studies had shown that this decade is considering the most uses of fuel in India, China other Asian countries while the Middle East and nations leading towards rapid urbanisation the demand of fuel is

increasing. Experts had enquired the age by saying that despite of oil, gas is having most demands. Therefore, despite of the natural resources of gas, the unconventional mode is effective in the increasing demand and use in the vast commercial levels.

Therefore the growth prospects incorporate aspects like a huge shuffling of the energy market. As the previous section had discussed upon the demands, a continuous supply is needed. The north American states is already a huge source of natural gas, as the shale gas had been introduced by them in the market, the pricing strategy and the leading decisions within the energy market have chances to grow as monopolistic (Wakamatsu and Aruga, 2013, pp. 1003-1004). On the other hand, as energy market is shifted to the United States, the pricing strategy is evident to change according to their decisions while flexibility will become a term existed.

The national aspects of growth in this context can be added as an advantageous point. As this study incorporates the American portion of shale gas revolution, the pros and cons of this industry is significant to discuss. (ChemViews, 2013, p. 20) had stated the American economy had took a leap as shale gas took a place in the regular dealings in the financial sectors. This automatically had increased the prospect of a separate industry which in turn had increased not only the revenue generation; but also the employment, the verge of development.

However, another aspect of growth and development remains in securing the property act carefully. As most of the reservoirs and the drilling sectors are settled in private lands, the larger areas used for exploring the unconventional shale gas is increasing the field of revenue generation (ChemViews, 2013, p. 20).

The global impact of the gas revolution:

The global impact of shale gas revolution is one of the most important aspects of this study. The global impact of shale gas revolution is manifold; from unconventional sources and their uses, the prospect of investment in the unconventional gas sources and taking contract, meet the supply and demand chain are no concerns and is able to affect the shale gas revolution hype. Uncertainty is the most common outcome in this aspect. Uncertainty remains from the very production time and continues up to lower investment levels, to the environmental acts and legislations, to meet the American constitutional acts of environmental and investment aspects, the uncertainties lies in meeting the uses of technical tools---horizontal drilling and hydraulic fracturing (Opolska and Jakubczyk, 2013, p. 570).

This again is the outcome of the market analysis that had emphasised upon the fact that in the global market of fuel and energy is now have a production cost similar with transportation cost. Therefore, a packaged drilling solution is in demand to meet the investments and production. The industry experts is of opinion that the packaged drill bits for shale gas operations had therefore have a development aspects while from the very bottom line of operations to the systems incorporating all the period to outcast the shale gas growth prospects and is mandatory to manage throughout the global supply and demand (Aer.ca, 2015).As the study had pointed out the different aspects of unconventional gas and its challenges and other uses, it can be stated that a sustainable option to create efficiency is necessary. Therefore, incorporating the stakeholders who are the policy makers, the industrial competitors, the environment scientists are important to have an effective outcome of the meet the challenges during the operation of gas exploration to export them and use. On the other hand, newer technical tool innovation is very necessary. As an increasing industry, the technical invention tools that will increase the productivity of the gas will manage the needs in a large scale.

On the other hand, as a golden age of gas and oil and energy, the recommendations lie in incorporating facilities that is effective in meeting the future uncertainties. With the older facilities available, it is easy to plan the large scale demand and supply of unconventional shale gas. Therefore, the supply should be in a chain that would definitely hit the demands and keep the chain tight.

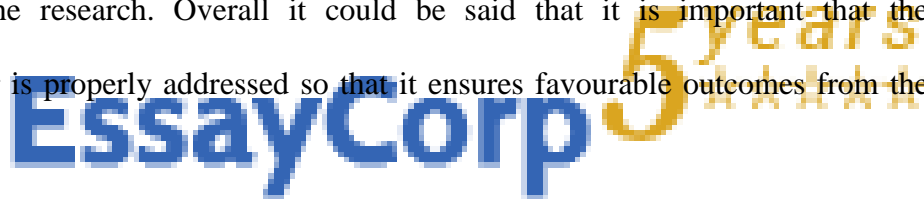
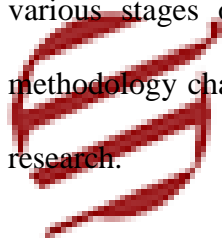


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Chapter 3: Research methodology

Introduction:

In this chapter the researcher would emphasize on the various methods and tools that have been adopted for the conduct of the study. It is quite important that for ensuring the success of the research outcome, the researcher must select effective methods and appropriate tools in the conduct of the study. This chapter gives an idea about the philosophy, strategy, approach and design that has been decided upon by the researcher for the conduct of the study along with the methods that have been adopted for collecting data and information from the respondents and their subsequent analysis methods as well as the significance of a timeline, ethical compliance (Bryman, 2012, p. 69). The illustration below gives fair idea about the various stages of the research. Overall it could be said that it is important that the methodology chapter is properly addressed so that it ensures favourable outcomes from the research.



Methods outline:

Corbetta, (2009, pp. 56-59) stated for a research study could be exploratory, explanatory or descriptive in nature. This research would follow the descriptive path as the researcher in the process of the research would attempt to study the existing theories and the findings that have been already established on the issue of the investigation on the present subject of Shale Gas Revolution and its global impacts and will allow a comprehensive study on this subject. No new issues or perspectives would be explored and neither would the study involve description of the research variables separately which ultimately negates the scope of the use of exploratory or explanatory research design.

The investigation strategy would be based on the case study of America's Shale Gas Revolution and the researcher would be using case complete the ongoing study successfully. It stands to be quite important for the researcher to effectively use the research design and strategy and also the philosophy of the research. In this research the researcher will use the positivism philosophy and the approach towards the research will be deductive. The positivism philosophy and the deductive approach will help the study to investigate the existing theories and concepts related to the study effectively and will help the researcher to get favourable results (Gulati, 2009, pp. 109-111). The research will be primary in nature and will involve quantitative and qualitative data collection. The present research will involve 4 managers involved in shale gas project.

Research onion:

Cooper and Schindler (2010, p. 29) had illustrated research onion as an effective step that helps the researcher to effectively select appropriate methods to carry out the research and provides a systematic framework that helps the researcher to get favourable outcomes in the research. Research onion provides the researcher with an appropriate picture which will help the researcher to effectively choose the methods and the data collection process. The research onion entails the process of identification of philosophy from the given choice of positivism, post positivism et cetera.

On the other hand the strategy, design and approach selection is effectively chosen by the researcher. Secondly the researcher will discuss the type of selection of methods out of mono, multi or mixed methods. This will be effectively discussed through framing of a timeline and carry out the present research in a longitudinal or cross sectional study. Lastly it will discuss the data collection and analysis process to obtain favourable result out of the research (Hamersveld and Bont, 2007, pp. 68-69).

Research philosophy:

Research philosophy is an extremely crucial stage in the methodology part. It is very important that the researcher selects appropriate philosophy so that the research is appropriately addressed. There are different kinds of philosophies available to be used in a research namely positivism, realism and Interpretivism which are used in different kinds of research. The positivism philosophy denotes that a social research could be done through scientific reasoning on the available theories present in the universe on the other hand Interpretivism is absolutely opposite of the positivism philosophy (Hamersveld and Bont, 2007, pp. 68-69). Realism is a philosophy which states that objects are present in the world and can be felt but they don't depend on human perception.

Justification for selecting positivism: For the conduct of the present research the researcher would adopt the positivism philosophy as the issue of the research can be best explained through the inclusion of scientific perspective hence it scores over the other philosophies. The adoption of this philosophy of research would also ensure triangulation of data from various sources that can prove to be effective in the study process. Positivism helps in effective gathering of data and emphasize on revealing the truth and help in control and assumption (Bryman, 2012, p. 69). Since it uses objective based studies it gets an upper hand against the other philosophies and works using the scientific theories. The positivist theory is used in this research since it perfectly goes with the research approach, design and strategy laid down in this research.

Research Approach:

Research approach stands to be of immense significance. The approach of the research indicates how will the research be done and how will we go about the research. Basically research approaches are of two type's namely inductive and deductive research.

Inductive research: The inductive research mainly moves from specific to general observations. In this kind of research approach there are no basic theories which the research follows. The research starts with the observations and ends with a fresh theory. This kind of research emphasizes on making theories and hypothesis (Cassell and Symon, (Eds.). 2004, p. 36). In this kind of research the researcher starts off with gathering information and then at the end segregates information which pertains to the research topic.

Deductive research: This kind of research topic is absolutely the opposite of the inductive research. This kind of research moves from general to specific observations focusing on the given topic from a general discussion. This approach is basically based on gathering information from relevant journals, theories and concepts and doesn't emphasize on creating new theories and only stress on the interpretation of the gathered information.

Justifying the use of deductive approach: In this research the researcher mainly emphasizes on gathering data from the available articles, journals and theories and interpreting them for getting favourable outcomes from this research study. Since the researcher doesn't think about creating any kind of theories in this present research it means the researcher has undertaken the deductive research in this present study (Gulati, 2009, pp. 109-111). Since inductive research mainly moves from specific to general approach it doesn't go with the positivism philosophy and the research design. It is extremely important that the researcher chooses the right approach and in this case the deductive approach will act in the most effective manner.

Research Design:

The research design is an extremely important aspect in the methodology part. There are different kinds of research design namely explanatory, exploratory, descriptive research. These research designs are most commonly used in the research procedure (Cassell and

Symon, (Eds.). 2004, p. 36). The present research is based on established facts, theories and concepts which are related to the research topic. These sources of data will allow the researcher to come to a favourable conclusion regarding the research and will also help to get favourable outcomes. The selection of favourable research design is extremely important for getting favourable results out of the research. Hence it could be said that it becomes extremely important that the researcher makes his design selection effectively so that the research process is carried out smoothly and favourable outcomes are received.

Justification for choosing descriptive design: Cameron (2009, p. 149) had pointed out that descriptive research design stands to be suitable for the present research because research issue in hand will be clearly defined and identified. The present research has prescribed set of objectives which would help the study and uses a mixed method towards data collection which is supported by descriptive design. The descriptive design forms suitable since the other two designs like exploratory and explanatory designs are not compatible with the research frame and getting background information only will not serve the purpose of the study.

Methods of data collection:

For the successful completion of any research study it is important that relevant data and desired information is collected by the researcher during the course of the research. The researcher would follow the qualitative approach to fulfil the objective of the ongoing research project. The senior managers who would be selected for the study process would be made to participate in an interview which would be conducted by the researcher based on the set of questions formulated by the researcher and their responses would be recorded for further analysis. For the collection of the secondary data the secondary sources of information such as blogs, internet articles, previous research studies, company journals and books would

be explored and reviewed by the researcher to gain insight about the previous findings and the theoretical perspective of the issue of the research (Cameron, 2009, p. 149).

Qualitative data collection:

The qualitative data collection purpose the researcher will frame interview questions and for the managers or the higher officials related to the shale gas project. The questions should be open ended, data gathered from individual interviews. Telephonic interviews to gather the primary data have been chosen to match the time constraint and according to the managers' availability (Cassell and Symon, (Eds.). 2004, p. 36)

Data Analysis:

Since the present research would be primary in nature the data that would be collected would primarily be qualitative in nature. The qualitative data would comprise of the responses of the senior officials of Shale gas project America which would be descriptive in nature and the quantitative data would be the feedback of the customers of the brand which would be numeric in nature. Hamersveld and Bont, (2007, pp. 68-69) said in the study that the descriptive data would be subjected to thematic analysis and the numeric data would be analysed by the utilization of the statistical tool of SPSS. The qualitative data comprising of the responses of the senior managers of the project would be collated under one theme and analysed while the tool of SPSS would help in analyzing the quantitative data through the use of graphical and tabular representations that would be followed by the respective interpretations so that the readers could grasp the outcome of the research with consummate ease.

Sampling:

The sampling method is very important in the context of the research as it ensures the validity of the research findings. It is very important for the researcher to effectively think about the sampling method and in how effectively it could be done. There are different methods of sampling but it is important for the researcher to utilize the right kind of sampling so that the research complies with the ethical considerations (Hamersveld and Bont, 2007, pp. 68-69).

The present research is based on non probability sampling. The purposive sampling is used for gathering the respondents and choosing the respondents who suit the research context out of a given mass. On the other hand convenient sampling is done in order to choose the senior officials sample that will help in giving information related to case study. The proper selection of the sampling method helps the researcher to gather right kind of respondents and company officials which has helped to gather right information related to the research subject.



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Time schedule (Gantt chart):

Main activities	1 st week	2 nd week	3 rd week	4 th +5 th week	6 th week	7 th week
<i>Selection of the topic</i>	✓					
<i>Composition of the literature review</i>		✓				
<i>Research methodology</i>			✓			
<i>Collection of primary data</i>				✓		

<i>Analysis and interpretation of data</i>				✓		
<i>Findings</i>					✓	
<i>Conclusion and Recommendation</i>					✓	
<i>Final submission</i>						✓

Ethical considerations:

The study had to be done undertaking the considerations of ethical issues. It is very important for the researcher to keep several things in mind while doing the research. First of all the data collected was only used for the present's research and will not be used for any other purposes and will be disposed once the research is done (Hamersveld and Bont, 2007, pp. 68-69). On the other hand the researcher did not intimidate anyone in the course of the research and convinced respondents by informing them about the research and letting them know of the entire procedure.

Chapter 4: Results and discussion

Introduction:

In this chapter of the study, the researcher had obtained a qualitative process of data analysis. Data obtained from the primary research helps in finding answers to the research questions which is on the other hand is related with the findings of literature review. Therefore, the researcher had a telephonic interview with four officials those are involved with the shale gas projects.

Part A—qualitative data analysis:

1. Is the shale gas revolution a truth or hype?

As the researcher had questioned the four managers who are related with the shale gas project about the reality; it was claimed by them that the shale gas revolution in deed a reality. As claimed by many that might be the shale gas revolution is not a truth, studies show that though not in a large scale but to provide the nation ample fuel shale gas is sufficient. The manager emphasised that though there is a hype generated as shale gas started producing; but it is not a lie.

The managers had said that shale gas is not available to use and export in the global market, still as the production is increasing and the technical persons are in a regular experiment with increasing the production when also reserving the gas in a large scale, the availability will increase soon to meet the economic requirements. They had also pointed out that the time is not far away when united States will be leading the energy market. The managers emphasised that as natural gas is the nation's property and is exported throughout the globe the option for shale gas will soon cop up with the conventional form of energy supply.

2. How much feasible is the unconventional gas option?

The managers disclosed that apart from the conventional gas options which are also responsible for global pollution and other hindrances, the unconventional option is always feasible. This again is the outcome of the market analysis that had emphasised upon the fact that in the global market of fuel and energy is now have a production cost similar with transportation cost. Therefore, a packaged drilling solution is in demand to meet the investments and production. The industry experts is of opinion that the packaged drill bits for shale gas operations had therefore have a development aspects while from the very bottom line of operations to the systems incorporating all the period to outcast the shale gas growth prospects and is mandatory to manage throughout the global supply and demand.

Gain, the managers had emphasised that the path of revolution as this is the unconventional source of fuel. The traditional forms and sources of fuel ha now had saw a new competitor. Moreover, the oil and energy production, reservation and pricing strategy of the unconventional shale gas had pointed out the revolution. One, through the production of fuel that is quite huge; and is able to moderate the second point of revolution-- pricing of the shale gas throughout the globe. As a consequence, this can be termed that as supply and chain is proportionate to one another, the cause of revolution and the results are quite inevitable

3. What are the main strategies to manage the shale gas revolution?

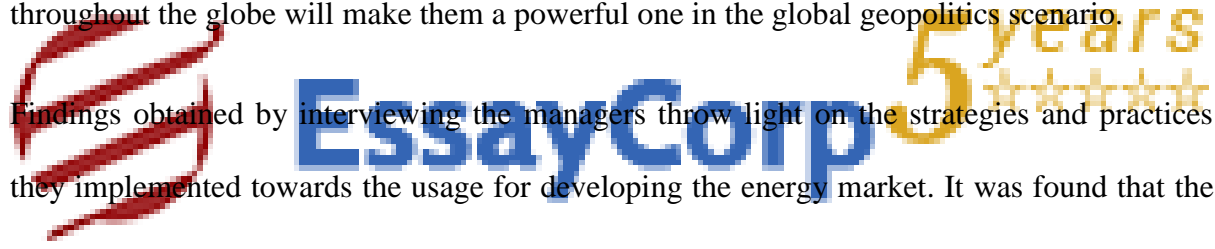
In context to this question, the managers had remarked that analysing the energy market is necessary. Therefore, a smart analysis of the market and incorporating aspects like political, social, economical, legal, technical and environmental is necessary. Therefore, to manage these important aspects while investing in shale gas projects and the purpose is to generate more for the global market, it is necessary to attract stakeholders in a lucrative manner.

It is also stated by the managers that an expansion of the process of gas exploration and activities like drilling and fracturing are facilitative as it comes to stimulate the market growth. So, the forecast made by the managers' states that as demand is increasing and the market will change its orientation, the shale gas projects and the several organisations undertaking the modes to improve the efficiency of gas production will be managed too.

Summary

The survey revealed that the managers are quite confident about the revolution and its outcome. They had also agreed with the fact that the United States of America has created the hype of shale gas revolution to meet the energy market monopoly. As the nation is already in a leading pce for producing natural gas, unconventional gas production and their uses throughout the globe will make them a powerful one in the global geopolitics scenario.

Findings obtained by interviewing the managers throw light on the strategies and practices they implemented towards the usage for developing the energy market. It was found that the managers are aware about the market, its strategies and the technical incorporating of techniques.



Chapter 5: Conclusion

The current chapter deals with summarising the entire dissertation by bringing together the knowledge gained through literature review and the empirical information obtained from primary research. The objectives formulated in the first chapter are linked with conclusion and arguments are put forward to ensure that the research objectives are met.

Linking objectives with the conclusion:

To investigate the hype of shale gas revolution thoroughly-- The price of gas in the United States had reduced due to the shale gas revolution. This is the option open to the users and the regular consumers to break the traditional consumption of natural gas and serve the global energy market. Automatically, the effects had affected the gas market and the supply and demand chain of energy while pointing out to the business patterns so far and the required changes to meet the already changed competitive situations. Simultaneously, the aspect of development and growth comes in a row as the United States of America had played as one of the key components to determine the competition. Qatar being one of the leading players in supplying the natural gas in liquid forms; mostly termed as LNG in the industry, the revolution of shale gas had focussed upon the control of America in the international trade market as the shale gas had created an industry that is serving within the country to improve employments and revenue generation at the same time. Therefore, the national, international and the trading aspect are served at a time by using the shale gas revolution and made the nation a 'swing supplier'.

To explore the global gas market for a better understanding for more options-- The natural gas is one among the very few sources that are provided by the Mother Nature to the human being and had helped in every manner for development and the process of civilisation had been totally a failure instead of this natural gas. As it comes to fuel consumption and the

discussion incorporates natural gas, the option to discuss the natural gas a commodity cannot be missed. As the usability became more visible, the interplay of export and import among nations took an extra verge. The business incorporated in aspect with need while the power play affected the global market.

To analyse the unconventional shale gas option and its feasibility-- As the year 2010 had seen the maximum eruption of shale gas, the global market of gas and oil, commonly termed as power balance had introduced the revolution that had termed as shale gas revolution. Simultaneously, the United States geological survey had highlighted shale gas with the following aspects that is again information to learn the advancements, applications and innovations. Being an American, rather North American product, shale gas has the capability to manage the geopolitics tie ups around the globe; among nations.

On the other hand, the effectiveness of using shale gas broadly met in the North American countries and the states. Therefore, the emerging countries with lesser fuel source or revenues floated to import fuel and gas has a new option as the shale gas revolution had provided them the path of creating a market lead by the American power users. However, the opinion of sharing the shale gas and the power house responsibilities withholds with American acts of managing single handed the energy market.

To identify the challenges in the global gas market while establishing shale gas as a feasible option--- Shale gas is a feasible option to develop the another option to fuel and energy. However, according to the previous sections of the study, the challenges remain in transportation the fuel and its costs. The transportation cost is heavy and that affects the market and its leaders. On the other hand, the pricing strategy being a sensitive issue for gas market is a challenge. An effective pricing strategy is necessary for increasing the efficiency

of unconventional gas source. Again, once it is told that the unconventional gas and about its economic uses, the discontinuity for a change would make a threshold in the global economy.

Recommendations:

As the study had pointed out the different aspects of unconventional gas and its challenges and other uses, it can be stated that a sustainable option to create efficiency is necessary. Therefore, incorporating the stakeholders who are the policy makers, the industrial competitors, the environment scientists are important to have an effective outcome of the meet the challenges during the operation of gas exploration to export them and use. On the other hand, newer technical tool innovation is very necessary. As an increasing industry, the technical invention tools that will increase the productivity of the gas will manage the needs in a large scale.

On the other hand, as a golden age of gas and oil and energy, the recommendations lie in incorporating facilities that is effective in meeting the future uncertainties. With the older facilities available, it is easy to plan the large scale demand and supply of unconventional shale gas. Therefore, the supply should be in a chain that would definitely hit the demands and keep the chain tight.

The global impact of shale gas revolution is one of the most important aspects of this study. The global impact of shale gas revolution is manifold; from unconventional sources and their uses, the prospect of investment in the unconventional gas sources and taking contract, meet the supply and demand chain are no concerns and is able to affect the shale gas revolution hype. Uncertainty is the most common outcome in this aspect. Uncertainty remains from the very production time and continues up to lower investment levels, to the environmental acts and legislations, to meet the American constitutional acts of environmental and investment

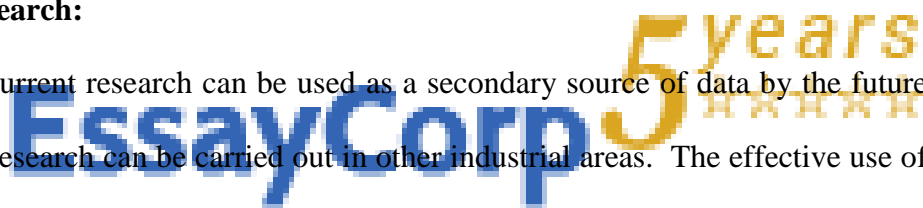
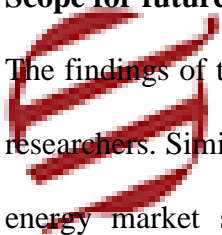
aspects, the uncertainties lies in meeting the uses of technical tools---horizontal drilling and hydraulic fracturing.

Limitations of the research:

Time constraints and low budget were the main limitations of the research due to which only a cross sectional research was carried out. A longitudinal research would have increased the reliability of the study as the same primary research carried out at different phases with different sets of respondents would have provided extensive data. Apart from this, small sample size for both survey and interview is also a limitation. A larger sample size would have increased the validity of data to a large extent.

Scope for future research:

The findings of the current research can be used as a secondary source of data by the future researchers. Similar research can be carried out in other industrial areas. The effective use of energy market studies and the global impact of the similar can be used for further consideration of understating the sector.



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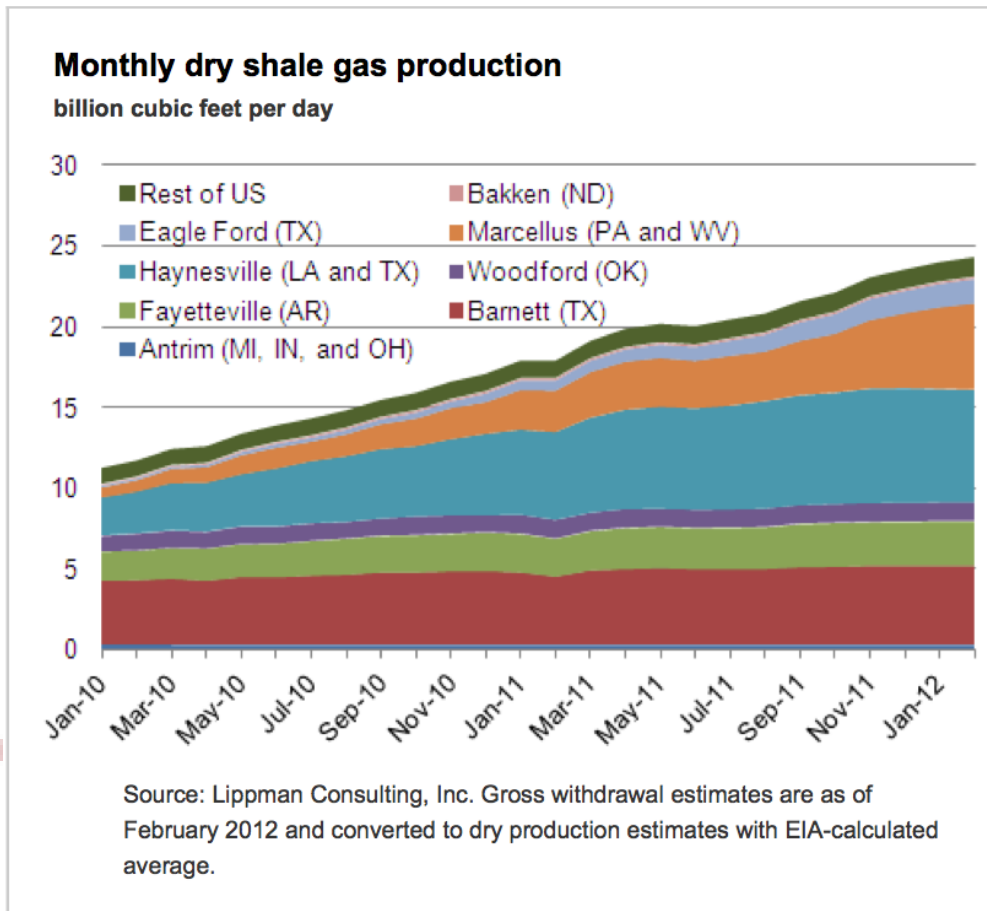
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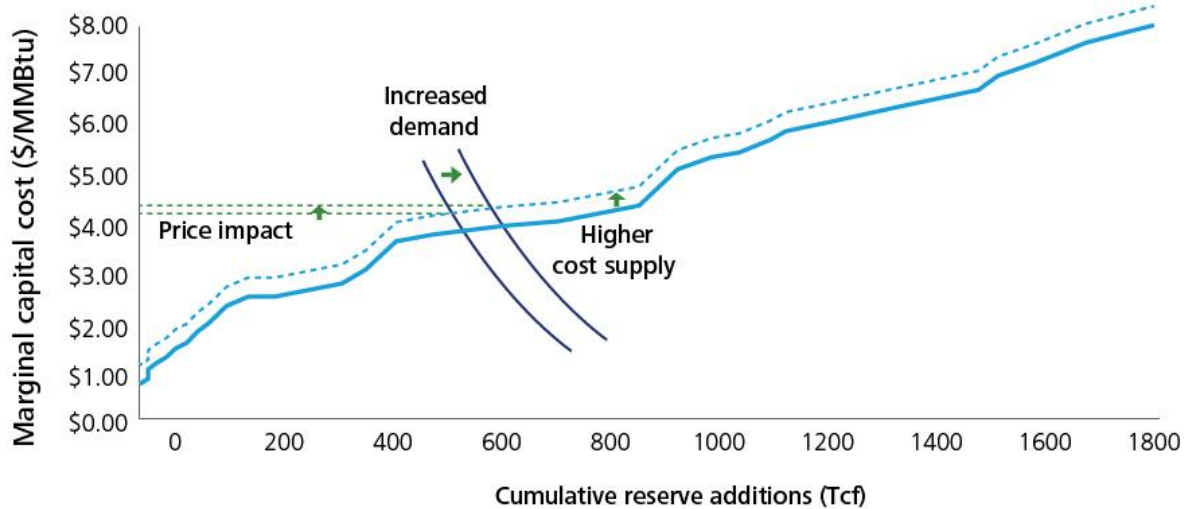
Appendices:

Appendix 1:



Years
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Appendix 2:



Graphic: Deloitte University Press | DUPress.com

Appendix 3:

The big players in Oil & Gas

The big league

Oil companies

Company	Production, 2012 or latest, m b/d*	Reserves, 2010 or latest, bn barrels*	Market value, 2013†, \$bn
Saudi Aramco	12.7	307	na
Gazprom (Russia)	8.4	112	92
NIOC (Iran)	6.1	311	na
Exxon Mobil	4.1	25	417
PetroChina	3.6	23	239
Kuwait Petroleum	3.3	112	na
Shell	3.3	8	218
Pemex	3.2	11	na
BP	3.0	7	130
Chevron	2.9	9	244

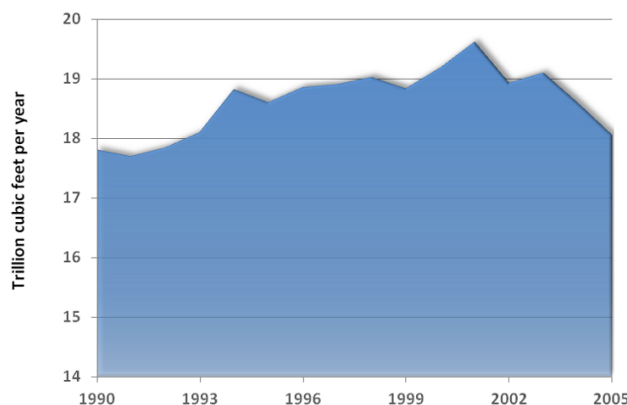
Sources: Oliver Wyman; Wood Mackenzie; Bloomberg; company reports *Of oil equivalent †July 31st

The top 10 global players control almost **60%** of the total daily oil supply

Appendix 4:

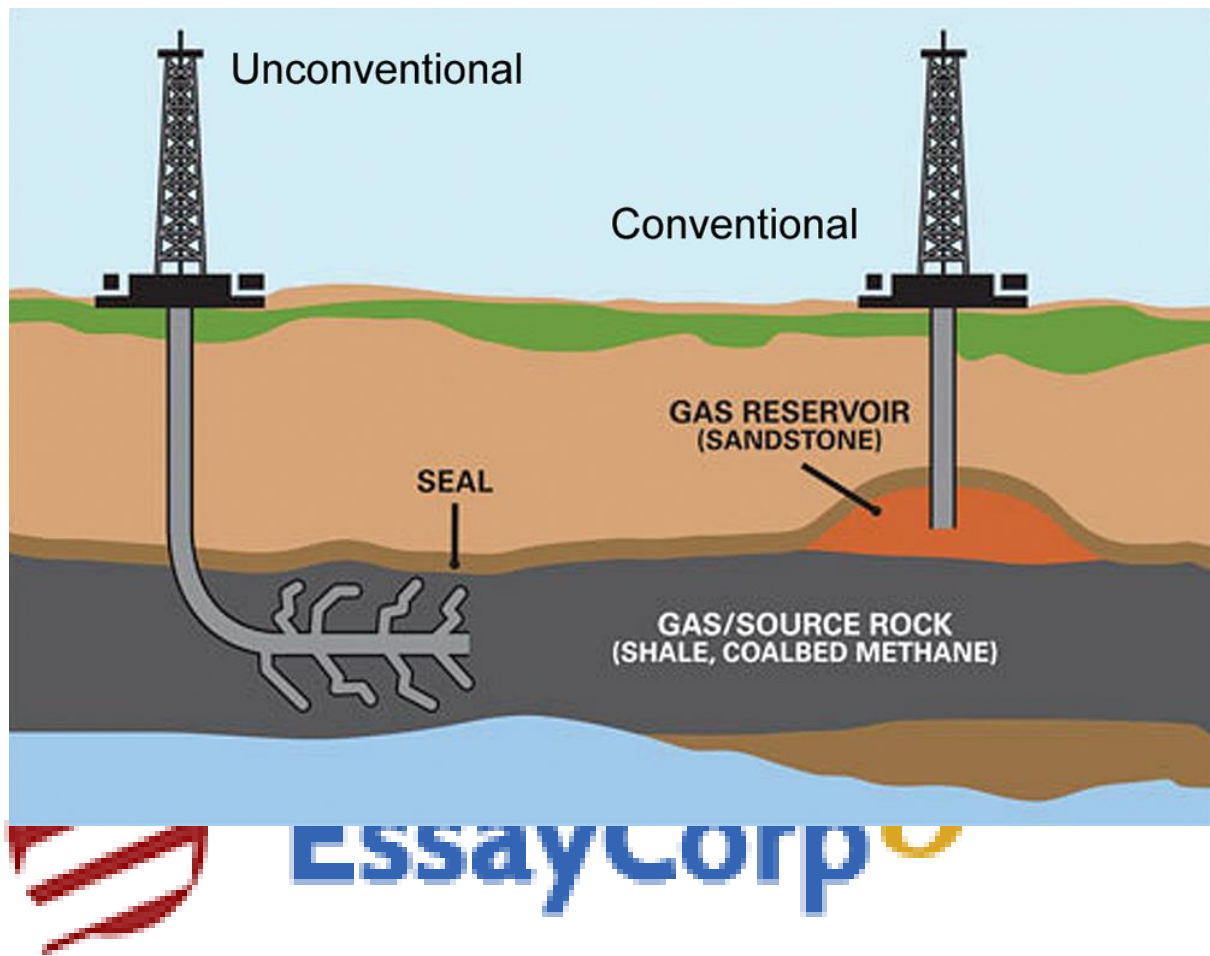
U.S. dry gas production 1990-2005

Annual production dropped 6% between 2000 and 2005



Source: U.S. Energy Information Administration

Appendix 5:



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