

CHAPTER 7

CONCLUSION & RECOMMENDATIONS

The preceding chapters have concluded that there are clear geostrategic implications of the Shale Oil & Shale Gas insofar as India is concerned.

The first chapter has laid out the basic structure of the dissertation including a review of literature, extant research gap, the research methodology & data sources etc.

The second chapter, 'Shale Oil & Gas' includes the terminology associated with Shale Oil & Shale Gas, technical processes related to extraction and details of hydraulic fracturing. Global estimates of Shale reserves have been included. These estimates indicate substantial Shale Oil & Shale Gas reserves, available worldwide. Shale Oil may add up to 10 % of all oil reserves, worldwide, while Shale Gas additions are even more notable, at over 30%. The Shale Oil & Gas production levels in the US have been included and thereafter. It can clearly be summed up that technological breakthroughs and hydraulic fracturing has enabled extraction of a new 'unconventional' source of oil & gas, Shale Oil & Shale Gas. Production over the last decade has continued to grow, especially in the US.

A brief case study, of one of the Shale Oil & Gas fields in North Dakota, in the US the 'Bakken' has been built up. Bakken is one of the largest oil & gas fields in the continental US, producing ever increasing amounts of Shale Oil & Shale Gas in recent times. The EIA monthly report of February 2015 has reported that Bakken has since produced 1.31 million barrels of oil per day & 1,541 million

cubic feet of gas per day. The Bakken is a symbol of a Shale Oil & Gas success story.

The third chapter 'An Economic & Political History of Oil' is a piece of historical research. It traces the discovery of oil in Titusville, Pennsylvania, in the US. The development of the oil industry, the motor car & the aircraft and the shift of oil, to replace coal, just prior to the First World War, have been chronologically brought out, to underscore the process of how oil turned into a strategic commodity and thereafter, its political and economic history. The chapter also chronicles how oil has been used as a weapon, as a tool for economic development, and how it has been used by governments for geopolitical and geostrategic leverage. America's quest for energy security, then energy efficiency and now, for energy independence, all has been chronicled here. The chapter rounds off by quoting the US President, Barack Obama as saying that America is number one globally, in both oil & gas production, as of January 2015.

The fourth chapter, 'Shale Oil & Gas - A Game Changer or Otherwise', looks at answers to the two related research questions "Will Shale Oil & Gas impact the global dynamics of 'conventional' oil & gas? Under what conditions can it become a game changer?" These research questions are answered, based upon geopolitical factors, economic factors, legislative factors and technical factors.

Shale Oil & Gas can actually become game changers. The geopolitical conditions, due to America's desire for energy independence & its quest for energy efficiencies are supportive. The economic conditions for Shale oil & gas extraction are favourable, but for the present dip in global oil prices, which are

expected to go back to about 70-75 US \$ / barrel. Should the global crude prices remain above the 70 US \$ /barrel mark, economically there is no looking back. Legislative Frameworks exist in some countries, and some are in the process of evolving them. Technically, technology is mature for extraction and availabilities have been assessed. However, concerns related to water scarcity do preclude Shale Oil/Gas extraction from some regions around the world. Similarly, some environmental concerns remain & need to be addressed. Whether Shale Oil & Gas actually do become game changers will depend, finally, on a juxtaposition of each of these factors, but research indicates that it is likely to become a game changer, especially Shale Gas.

The fifth chapter, 'Shale Oil & Gas: Impact on the Indian Economy' answers the research question "How is Shale Oil & Gas likely to impact India's economy? Will it result in a reduced import bill etc?" India's economic and strategic dependence on imports of oil & gas and the impact that currency exchange rates can have on the Indian economy have been studied. In addition, the effects of changes in global oil & gas prices have also been related to the Indian economy. India's present & future energy mix has been researched and analysed to study the impact of shale oil & gas. India presently does not have any operational Shale Oil/Gas fields. However, the strategic context has been researched & analysed. A shale oil/Gas boom is likely to lead to a moderation in global prices.

The crux of the findings in this chapter is that should the Shale 'revolution' truly happen, and not turn out to be a short-lived phenomenon; the impact on India is assessed to be substantially beneficial. Low oil prices, of the kind being

witnessed now, i.e. in the range of 50-60 US \$/ barrel, due to Shale Oil & Gas led oversupply, coupled with a marginal lower global growth rate, have so positively impacted the macroeconomic situation for India. India must enjoy this phase of low oil & gas prices, and use this opportunity to invest in developing the economy & the country, till this phase of low prices continues. To derive optimal benefits from unconventional oil & gas, and in order to reduce external dependence of energy, India needs to push domestic oil & gas exploration & production efforts, in all its prospective Shale basins, and supplement its conventional oil & gas production.

The sixth chapter, titled 'Geostrategic Implications for India & Choices for Energy Security' answers the last research question, "What strategic choices can India make, to further its energy security & national interests?" In researching the answers to this question, the first region to be looked at through the geostrategic prism is the Middle East. Due to substantial Shale Oil & Gas production in the US, its dependence on the Middle East for its import of oil & gas has reduced. Thus energy security calculus of the US has been recalculated, reducing its erstwhile importance of the Middle East. As the US becomes energy independent, the relative importance of the Asia-Pacific Region is on the increase. The 'Pivot to Asia' is seen as a step in this direction.

Shale oil & gas have driven down global prices. Resultantly, the Middle East nations will have adverse fiscal balance in their annual budgets. Since they have over time become used to comfortable fiscal balances due to strong oil & gas prices, these countries will hurt most. And this is likely to increase instability. Additionally, fiscally constrained states are also known to become weak over time

and may not be able to ensure being the sole authority for use of force. Afghanistan, Syria, Yemen & now Iran are cases in point. Non-state actors emerge, as is now becoming evident. ISIL is a case in point.

In such a context, with the US likely to vacate the regional security role in the Middle East, a strategic vacuum may emerge in the near future. While Russia & China are contenders, it is for India to fill this vacuum, in its own interest. This will require increases in its strategic military capabilities. The geostrategic implications & opportunity are increasingly evident.

The traditional energy flows are changing. More oil & gas will flow eastwards from the Middle East & Arabian Gulf to India, South Asia & China. This implies security of the sea lanes in the Arabian Sea & the Indian Ocean. The Indo-US strategic shifts are promising portends in the correct directions.

Additionally, to ensure energy security, India must get onto the Oil & Gas technology bandwagon, develop better relations with the Arab countries in the Middle East and get into strategic oil & gas agreements & cross investments, worldwide. Equity based investments in Shale fields worldwide is a contemporary practice & India too must invest in future sources of oil & gas. India must unlock its unconventional gas potential. India must enlarge the scope of its Shale Gas policy to include private and public sector players alike. Since Shale Oil production in the US is expected to rise to levels beyond current US imports, Middle East and Africa will seek stable, large markets in the East. This shift will give India a unique opportunity to create an 'India-Middle East Energy Corridor'.

Key Recommendations

India must recognise the long term geostrategic implications of the Shale Oil & Gas revolution and make the most of the opportunities and meet emerging challenges. India must enjoy the low oil & gas prices, economically. It must use this economic opportunity to leverage growth nationally, invest in state of the art energy technologies and look at technology transfers, from the US and other global leaders. This is also the opportune moment to restructure energy subsidies, nationally as well as energy pricing regimes.

Some of the other actions that India needs to take, to further synergise its various elements that will contribute to its energy security are:-

- Resolution of the border issue with China from a position of strength. (Next order implication is sustained growth of India as a nation and its economy & trade).
- Long term, planned & sustained strengthening of military capabilities, transnational surveillance capabilities, and transnational cyber warfare & counter-espionage capabilities. This will help secure own energy interests, near and far. Taking a leaf out of America's book may not be a bad thing.
- India's need for greater engagement of Middle East nations, in the face of extant Middle East inclination to India.
- Build long term arrangements with countries like Saudi Arabia, Iran, etc, with whom relations are not at the desired levels
- Increase gas infrastructure in the country, e.g. LNG terminals for import and storage of gas, re-gasification, and pipe based transportation systems to facilitate greater use of globally available natural gas.

- International market price linked gas pricing mechanisms in India, for Indian & foreign interests to aggressively invest in India that will translate into actual gas flows.
- Shale Oil & Gas prospection aggressively
 - Nationally
 - Internationally
 - Equity based investments abroad.
- The Improving Indo-US strategic relationship must be leveraged to run its strategic course, to include Indian companies obtaining technology knowhow and transfer, in the fields of Shale Oil and gas.
- Established US companies be invited to come and explore suitable regions in India, for oil & gas, to include Shale Oil & gas.
- Change energy mix in power projects/ transport sectors.
- Improve national energy efficiencies
- Invest in next generation, clean energies like wind and solar energy.

With some of these actions, India may well be suitably poised to take on the challenges that are emerging and are likely to confront it. India must prepare itself to take on the mantle of a regional power, with a sense of altruism and responsibly, but backed by strong capabilities.