Chapter VIII

Roadmap for Downstream Oil Sector

Reforms in downstream oil sector in India is at a cross road. Analytical and application based research conducted on the subject through the previous chapters brings out a mixed baggage of outputs. While one set of output puts the policy framework in a kaleidoscopic glaze (pleasant scene), the other sets put forth a long, winding and rocky path before it (hard decisions waited). This chapter attempts to architect and build on the achievements of the past and draw a roadmap for the future. Attempt is made to put the actionable points within the time frame of XI Five Year Plan (2007-2012), which is under preparation.

XI Five year Plan will be a watershed period for the downstream hydrocarbon sector in India. It would have with it a history and foundation of 15 years of reforms. A lot of ground has been covered during the last 15 years towards liberalization, privatization and globalization. Most importantly, Oil sector, at the threshold of XI Five Year Plan, has unshackled and redeemed itself from the legacy of controlled and regulated era of 1970s and 1980s. Secondly, oil sector has survived and outlived the dilemma and oscillation of transition. Oil Sector has acquired a direction on which it can roll on, during next five years, amidst all hurdles. It has created a mindset and transcript of living in a global era with nationalist interest. The imagery and narrative to shift from national to global and from control to reforms, required to catch the imagination and win the confidence of the spectrum of mass opinion, has already been created and orchestrated. Oil sector has continued to remain at the centre of the whirlpool of macro economic reforms that India has passed through since 1991. Still it has long way to go in terms of building institutional and infrastructural setup and to attain maturity in terms of a vibrant and

growing sector with sound financials. Oil Industry will have to face a storm of cutthroat competition in which rules of game will be continually rewritten. It will have to tie integrating cord with its complementary sectors in the energy spectrum. All these would be done within the framework of evolving regulation, but less of control and still lesser supervision. The Petroleum Regulatory Board has come to exist and will set their norms and forms of regulation, while the State will continue to have its overriding concern for growth with distributive justice and welfare for the mass.

Taking in view the history of reforms in oil sector and in national economy, we have attempted in this chapter to draw a medium term agenda for Oil Sector. The chapter is organized in terms of the following sections:

1. What is medium term outlook for the downstream Oil Sector?
2. Challenges for Oil Sector in XI Five Year Plan
3. Recommendations

Section 8.1 : What is medium term outlook for the Oil Sector?

XI Five Year Plan for Oil Sector will simply not be an extension of X Five Year Plan or for that matter all earlier Plans. It will not be a planning exercise with incremental changes here and there; with little bit of updating, extrapolation, fine tuning with changes in other sectors and with macro environment. The scene of XI Plan will be painted on a canvass that is materially different from all the canvasses used in earlier Plans. In no other previous Five Year Plans, the successive Plan can be visualized to be so different from the preceding Plan that it can be said to have more changes than continuity in textures and features of the Plan.

XI Five Year Plan enters into India when India Inc is bullish on world market. The world has come to recognize that Indian economy is on surge; the tiger is out of cage. The market is inventing new vistas of making money in a manner as never before. Developmental and regulating institutions are coming of age and are asserting their pre-eminence by playing their respective role in their domain. In such a market, the economic infrastructure, like oil marketing sector has to play a supporting role. Oil market itself therefore undergoing a cataclysmic transformation as has been featured in previous chapters. Making a plan for 2007-12 in effect would mean a listing down the challenges and setting a canvass so that the sector meets the challenges as they unfold. The characteristic and distinguishing features of XI Five Year Plan in down stream hydrocarbon sector will be the following:

Private players: XI Plan will be the first Five Year Plan, when private players will have a significant role in Oil Sector. The largest refinery in the country is in private hand. The same company (RIL) is now set to put up another export oriented refinery at the same location. Essar has just commissioned its Jamnagar refinery. Domestic availability of petroleum products will no more be an inland logistics optimization issue, as it used to be in good old OCC days. Indian Oil market will essentially be a part of global market, where the commercial interests of the players will determine how much oil will be available in the country and at what price.

Full fledged downstream Regulator: XI Five Year Plan is the first Plan to have a downstream regulator in action. The Act has been passed on April 3, 2006. Members of the Regulatory Board have been appointed by Government in July 2007. In such a market, there will be decisions taken in the interest of consumer, market and competitive forces arising from the reform process. Expectedly market will gravitate towards maturity for the regulator to apply objective yardsticks to set and apply rules. The national interest, consumer interest and the enterprise interest will find a symbiotic formulation while competitive market forces will take its wing under the watchful eye of the regulator.

Government has announced the constitution of the Regulatory Board in July 2007. Regulatory Board is in the process of setting up its establishment and frame rules and regulations of fair business. The role of government and the regulator has been clearly outlined in the Hydrocarbon Vision 2025, Section III, Chapter IV, which has to be put in practice.

Some experts hold the view that 'Petroleum and Natural Gas Regulatory Board Act 2006 appears to be seriously flawed both in scope and in purview. (Mishra, 2006) There seems no clear mandate for the Board to ensure competitive markets, efficient prices and reasonable rates in oil and gas. The letter of the law does say that the Board is to foster "fair trade and competition". It is to oversee, for instance, "adequate availability" of oil products. Also the Board is to "ensure display of information about retail prices" at retail outlets. However, a glaring shortcoming in the Act is that there is no clear cut provision to enforce competitive prices. Sure, the Board is to "monitor prices", and "maintain a data bank of information" on oil and gas. But as per the Act, the Board has no explicit role in scrutiny of industry costs, in assessing prices and deciding on reasonable rates. Shortcomings of this type may be taken care by Board while framing its own rules and procedures of conducts by delegated legislation.

Fuel substitution by Gas: XI Five Year Plan is the first Plan to witness the full play of gas in the market. Hopefully Kochi terminal of Petronet LNG will come on stream. Gas from Krishna Godavari basin will expectedly flow through the pipeline grid all across the country. Gas will presumably supply above 10% of energy basket by 2030, rather than the current share of 8%. It will no more be 'Oil Industry'; it will be 'Oil & Gas Industry'. There would be refreshing reforms in the gas sector.

Like oil, India holds limited proved gas reserves, only about 0.6% of the world's total; but the balance between gas production and consumption is a little better than that of oil. India's share of world gas production is 1.1%, while its share of world consumption is 1.3%.

Proximity to several major gas producers adds financial and strategic incentives to the pipeline option. All pipeline options rely on difficult negotiations with neighboring countries. Four pipeline schemes have been under consideration for several years that would deliver gas from Bangladesh, Myanmar, Iran and Turkmenistan.

Gas sector world over is undergoing structural changes. Technological developments are making eco friendly gas an attractive economic alternative to oil even for markets distant from the source, making gas the fastest growing fuel in the global energy mix. Today, LNG is being hauled from as far away as Australia to feed the rapidly growing US and European market.

There is a structural change in the US and UK gas markets, as they move from self sufficiency to gas imports, one of the key drivers behind the acceleration of global LNG industry.

Experts in the emerging gas market advise that consumers of LNG must have a broadly diversified supply base to minimize consequences of any potential supply disruption. Expanding the number of suppliers often increases risk exposures, which can be most effectively moderated by pulling supplies from widely varied sources.

With say 10 to 20 percent gas in the energy basket, the 'Oil and Gas' industry in India would present an altogether different landscape. Gas market has multiple technical, commercial, regulatory and long term investment related (financial) issues, which will present a veritable challenge to the policy makers and players in the market.

LNG imports are expected to increasingly contribute to availability of gas in India, but it is less certain, as detailed in section 8.2 below under the heading 'Gas Pricing', that overseas export projects will keep pace with demand. As one Industry observer puts it, 'between now and 2030, we

might run into geopolitical problems relative to LNG similar to what we have experienced with crude oil. There is not enough LNG export capacity going into place during the next 15 years to keep pace with demand."

India needs to learn hard lessons from the experiences of UK and US, where gas market has developed maturity. When Russia cut off natural gas supply to the Ukraine in January 2006, the action sent shockwaves through the world. (Dweck, 2007)

Integrated energy policy: India in XI Plan period has to have an integrated energy policy as the country enters into a high consumption and low indigenous production zone. In the absence of an integrated energy use pattern, there will be wastage and sub-optimal energy planning. It might pose a tall order for the Government to operate an integrated energy policy through its centralized planning process. There will however be a move in that direction by market forces. Planning has to create conditions for that scenario. Reform process will hopefully set the context for that.

A market with product surplus: For almost half a century (till the turn of the century), India was a net importer of petroleum products and it earned a status of a big buyer in international oil market. The buying process of Indian PSU Oil companies was keenly being watched by traders. Indian ports were congested with vessels with products for discharging. In a port like Kandla, the only inlet for North and North West India as it was during 1990s, it was not uncommon to see half a dozen vessels with diesel on board to float in queue for getting a berth for discharging imported cargo. Situation started changing slowly by the turn of century. (Details on export of products is given in Chapter III, Section 3.3 and Chapter VII, Section 7.4.4) XI Five Year Plan will be the first Plan when India will do both import and export on equal vein. The refinery utilization in Asia Pacific and West Asia will be contingent upon Indian refineries throughput. With a projected refining capacity of say 235 million tonnes and consumption of say 150 million tonnes, India will be a hub in the south Asian region for petroleum products. XI Plan will witness oil trading on Indian waters, both in paper and in physical.

Forward and backward integration: Some of Indian Oil Companies will be a conglomerate of large value chains. Besides Oil, they will be dealing with Petrochemical, Power, Lube Oil Base Stock of superior quality and so many products of extended value chain. Oil refineries will be undertaking secondary processing of crude to squeeze higher value from the barrel. Some downstream oil companies also have started investing in upstream assets, with a view to becoming integrated Oil Companies. All these, as outcome of reform process, will pose a different order of challenge in value generation, logistics planning, technology planning and capital

investment. XI Five Year Plan will witness a complex oil scenario, the kind of which was never seen in India.

Risk management: Risk management is an integral part of trading. International oil market has well developed institutions and practices for Oil trading. Indian downstream oil marketing companies have already put in place structure and policies for trying their hands in price risk management. Multi Commodity Exchange have launched rupee denominated contracts for trading in Crude, Furnace Oil and Natural Gas. XI Five Year Plan will witness the play of paper market, which will integrate capital market with oil market. This will open an entirely high risk and high capital avenue in Indian Oil market, the like of which was never been there in the country before.

The launch of crude oil futures contract at the Dubai Mercantile Exchange in June 2007 has provided Indian oil companies another window to hedge against risks by volatile global prices. The new futures contract is based on the sour grade crude oil that is produced abundantly in West Asia. The Dubai Mercantile Exchange is a joint venture between Tatweer, part of Dubai Holding, and New York Mercantile Exchange (Nymex), the world's largest energy trading centre.

A recent policy research working paper at the World Bank examines the effect of crude oil prices on the prices of as many as 35 internationally traded primary commodities over the long term. The study finds strong correlation between crude prices and those of other commodities. What is implied is that should crude prices remain buoyant – as most analysts expect – the ongoing hardening trend in commodity prices ought to last much longer than earlier booms. (Mishra, 2007)

Knowledge based: Oil industry is slowly but steadily moving away from conventional skill to technical skill. The young entrants into the Industry are equipped with high profile and multi level skill. They have international exposure. Their working style and professional aspirations are something that can be called path breaking. XI Five Year Plan will have the opportunity of dealing with skilled manpower developed by specialized institutes like Indian School of Petroleum (ISP) and University of Petroleum and Energy Studies (UPES). Educational platforms like ISP & UPES have brought about a revolution in education, experimentation, project management and learning environment in Oil and Gas sector in the country. Two more such specialized oil Industry linked Institutes are in the offing: a) Institute of Petroleum Management, Gandhinagar, promoted by Gujarat State Petroleum Corporation; b) Rajiv Gandhi Institute of Petroleum Technology in Uttar Pradesh by PSU Oil Companies under the aegis of Government of India. Shell is planning to set up an R&D centre at Bangalore.

Worldwide, Oil Companies are going to invest heavily in knowledge management including automated online operation monitoring and information sharing. Swelling requirements for crude oil and other petroleum products in emerging markets such as China and India will lead to fuel investment in exploration activities. Furthermore, dynamic geo-political factors will cause uncertainty regarding crude oil supply. The oil and gas industry has to deal with higher project management costs, thereby creating the need for higher operational efficiencies.

Focus on risk management and operational efficiencies would drive technology spending by Oil and Gas Companies. Effective and efficient risk management necessitates real-time access to data related to all phases of oil and gas sector such as geological surveys, seismic studies, and oil well drilling.

Other key factors leading to greater technology spending by oil and gas companies include regulatory compliance, integration of new business units as a result of mergers and acquisitions, environmental compliance of fuel quality and better management of marketing functions within the service station segment.

With regard to information technology spending, the oil and gas sector is likely to hike up investment in network design and implementation, data transport services, storage services, and wireless capabilities. The need to connect multiple sites - both inland and off-shore facilities - is expected to continue to drive oil and gas companies' spending in wide area network services utilizing wireline, wireless, and satellite platforms.

Oil and gas companies are anticipated to respond more favorably to customized IT/telecom solutions that often require developing partnerships with other best-of-breed hardware, software, and services providers.

Threat of Peak Oil: While this year's record high oil prices are unlikely to come down in the near future, analysts are warning the world's traditional and emerging economic powers to curb consumption, saying that at the current rate, proven reserves will only meet demand up to 2030.

The United States devours one out of four of the 84 million barrels of oil consumed daily around the world, and one out of two liters of gasoline. But the emerging powers are steadily closing the consumption gap. In India, less than 200,000 new cars were sold annually two decades ago, compared to 802,000 in 2004.

Since oil began to be drilled in 1859, the world has consumed 900 billion barrels - nearly half of the planet's reserves, which means world will have oil for another 50 years at the most.

But because consumption is increasing every year, driven by economic growth rates like those of India and China - which have ranged between seven and eleven percent a year - oil will perhaps only last until 2030, even including reserves like Alaska's and the Athabasca tar sands in Alberta, Canada.

That long-term outlook will also be affected by more immediate political factors, like the difficulties faced by the United States in the Middle East, rebellious governments like those of Venezuela and (the future administration of leftist president-elect Evo Morales in) Bolivia, or the radicalization of Iran's leadership. On the economic front, these developments would discourage investment by large corporations. The competition between China, India and other emerging powers to get their hands on the available oil resources, and the real or expected decline in deposits in the North Sea, the Caspian Sea, Mexico or Siberia in Russia, lead one to believe that "The era of cheap oil is over". U.S. benchmark West Texas Intermediate (WTI) soared to 70.85 dollars per barrel on Aug. 30, 2005, when Hurricane Katrina devastated New Orleans and much of the U.S. Gulf Coast oil-producing region.

The Organization of Petroleum Exporting Countries (OPEC) basket of crudes averaged 50 dollars a barrel in 2005, bringing the members of the oil cartel more than 500 billion dollars in revenues. By comparison, the average price stood at 36 dollars a barrel in 2004, and 28 dollars in 2003. During 2006 and 07, it is prevailing at above 75 dollars a barrel.

The markets cannot be stabilized if political instability is provoked in producing countries, because that gives rise to high costs and uncertainty. Examples are: the U.S. invasion of Iraq, and the George W. Bush administration's pressure on Iran and open hostility towards the Venezuelan government of Hugo Chávez.

All these factors together hold out a scenario of continued high demand and constrained low supply of oil in global oil market during XI Five Year Plan period.

Section 8.2 - Challenges for Oil Industry in the XI Five Year Plan

Reform measures undertaken so far in Indian downstream oil industry is in right direction. There are however challenges before the industry for the outcome of reforms to take place in consonance with national agenda.

Downstream Oil Sector in India, dominated by PSUs as of now, has to improve its productivity and adaptability with the fast changing environment; domestic as well global. Changes and challenges are confronting the downstream oil sector on almost all fronts. One, there is a supply constrained global oil market; second, there is national economy undergoing a massive transformation; third, the downstream oil sector itself has many issues to deal with and stakeholders interests to take care of. Fourth, because of the global upswing in the commodities business, there is a huge shortage of resources in terms of construction, engineering equipment and people. Lead time for equipment deliveries for Indian refineries is getting longer. Major crunch for Indian refiners is for project management and field marketing jobs. (Behuria, 2007)

The wind of reforms sweeping national level has to spur micro reforms at enterprise level, so as to derive benefit from the competitive forces unleashed by the reforms. This poses a multi-disciplinary managerial challenge for the Oil Companies and talents have to be harnessed for this purpose. It must be appreciated; economic reform is policy level directional change, whereas micro reform is enterprise level implementation issue. Both have to support each other for the benefits of reforms to accrue.

Enterprise Level Micro Reforms

Micro reform at enterprise level essentially is a function of top management of PSU companies. Basically, top management has to take care of few issues:

- Sound internal business process has to be laid.
- Competence and merit amongst staff have to be rewarded.
- Enterprise level decision making has to be strengthened with the help of sound business analysis.

- Anticipate and adapt to changes happening in the industry and in the environment.

- Identify and retain talent in the Company.

For the above to happen, the planning department of each PSU Oil companies has to be strengthened. There would be economic advisors to top management. They will be conducting intelligent and application oriented research and monitoring. There has to be more active collaboration with research institutes and consulting firms.

Competition is supposed to keep the productivity level of Oil companies high. Therefore, investment climate and operating environment has to be free from all policy restrictions. Following aspects need special mention:

Diversification and Specialization

Indian PSU Oil Companies have to provide total energy solution to the users. That is how integrated energy planning can be done at enterprise and at end-user level. In global oil market, the 'energy company' is replacing the old notion of oil, gas and electricity companies.

The trend towards the creation of integrated energy industry means that resource based ownership no longer gives a company competitive advantage. The focus is now on end user and the process of integrating the industry with the end user is no longer the traditional asset based vertical integration method, as was seen historically in the oil sector.

In global arena, until 1970s, most of the multinational oil companies (MNCs) were operationally vertically integrated. In addition to providing very significant barriers to entry, there by restricting competition, that also enabled price discrimination, whereby companies could vertically integrate into the demand elastic (low price) market to prevent resale into the inelastic (high price) market.

That situation was altered when the upstream assets of many of the multinational oil companies were nationalized in the early 1970s. Initially this did not cause major changes to the crude oil market since the MNCs retained the preferential right to market the crude oil produced in the former concessions. However, once these long term crude contracts were broken at the end of the 1970s in the second oil shock, operational vertical integration began to disappear. As a consequence, more arm's length offerings by producing governments increased the volume of transactions in the market and with it came market efficiency. As market transaction costs fell, private oil companies began to move voluntarily away from operational vertical integration, there by increasing market volume.

By 1990s, only a few of the MNC operations could be described as being operationally vertically integrated. In fact, even those MNCs, whose refining capacity equaled oil production capacity, could not claim to be operationally integrated as most of their transactions for the purchase and sale of crude oil and products were not completely met internally but externally, through the crude oil and products market.

In world market, although the oil industry today is no longer operationally integrated, it can be described as being vertically integrated financially. Financial vertical integration is when a company owns or controls the cash flow in different stages of the industry. Clearly, vertical financial integration is a prerequisite if operational vertical integration is to be present. However, operational vertical integration is not an automatic consequence of financial vertical integration. Hence, the E&P division of a major can sell into the crude oil market, the refining division can buy from the product market and the marketing division can also buy from the product market. In essence, the MNCs are operating like diversified industrial conglomerate.

Fifteen years ago, MNCs world over accepted that its priority was to improve returns to shareholders before it could possibly contemplate growth. 'At the same time, it recognized the need to deal with the challenge of increased commoditization, the erosion of competitive advantage due to information technology and the challenge of how to adapt to an increasingly global market. While the industry has succeeded in improving profitability, it now faces equally daunting challenges, which affect each of the separate business segments. Today, the biggest challenge for the integrated companies is to kick start growth.' (Antill, 2002)

All that was a challenge for MNCs before ten to fifteen years is posing a threat to Indian PSU Oil Companies today.

Availability and affordability

Taking into view the non-linear growth in demand within uncertainty and risk, Oil Industry will have a gigantic task of meeting the demand. Given the demand, supply chain management will be a complicated job. Industry will be under pressure to cut costs. In India we have before us examples of such sectors which have been exposed to competition as telecom, aviation and automobiles. There is a great similarity in the pattern of these three sectors with Oil sector. Uniqueness in Oil sector is that Oil is largely imported and it is a scarce commodity globally. Not withstanding the above, competition might force to re-examine the cost structure and value addition in the product.

Typical demand structure in India is asymptotic, arising out of unevenness in the per capita income distribution in the country. High and growing income should not be taken as symptom of high purchasing power. India is a huge country and at per capita level, there is much gap between the highest and lowest per capital income. Oil Companies will have a task to make product available at a price affordable to various sections of the people.

The challenge of making petroleum products available all across at an affordable price, is in fact a socialistic challenge of justice and equity.

Integrated Energy Policy

There is a crying need for having an integrated energy policy, which would rationalize energy choices in a free market economy, while ensuring efficiency and least cost. The integrated policy would look at energy supply and demand in totality, such that country's requirement is met, with due concern for environment, energy security and affordable price.

An integrated energy policy recognizes the trade off in energy choices in an economy and optimize over the same such that the end uses for which energy is demanded are met in the most efficient and least cost manner. At the core of an integrated energy model is the idea that the end user does not want a particular fuel, but the services derived from using that fuel – heat, light, transport and so on. Since the energy sector is dealt with by several ministries, there is a need for coordination and integration among these ministries. Reforms in the power sector for example are suffering from the lack of progress in coal reforms while coal movement suffers from the lack of tariff rationalization in the railways. For the smooth operation of the energy sector, there should be a well established institutional framework consisting of regulatory agencies, the rules and regulations of the sector and policy guidelines.

While there is no dispute that an integrated energy policy is the need of the hour, there clearly exists an unresolved issue that an integrated pricing holds the key to the above policy. Economic theory advocates that when prices paid for energy do not reflect production costs, opportunity costs and supply demand balance, that energy is usually allocated in less efficient ways and even wasted. It is argued that pricing practices followed in various energy sectors in India reflects a situation where country is not able to raise resources to meet its energy requirements and investments. There is very little incentive for a large segment of users to either use energy efficient equipment or alter their usage to lower the demand for additional investment in building peak capacity.

Objectives of Integrated Pricing Policy

Pricing is the key to integrated energy policy. Pricing has to stand the test of economic prudence, and at the same time to be discriminating for various economic strata of consumer with their specific choice and in line with the quality of product and service. To the extent conscious effort is made by the Government to insulate the domestic pricing from the vicissitude and volatility of international market, Government is in fact serving the cause of equity and justice for the masses.

Oil companies will make price affordable by means of efficient operation. Efficiency and productivity will come out of competition. In a competitive environment, there will not be any entry barrier; there will be option to exit and the firm will have the freedom to decide the price and quantity.

Objectives that must be considered in energy pricing are: (1) economic efficiency, (2) social equity, and (3) financial viability. The efficiency principle seeks to ensure the regulations of prices in such a manner that the allocation of the society's resources to the energy sector fully reflects their values in alternative uses. The equity principle relates to welfare and income distribution considerations. It may result in charging differential prices to different users on grounds of basic needs, or in the establishment of uniform prices to specific user groups in spite of differential costs of supply, often justified in the name of regional equity. The financial principle suggests that energy supply systems should be able to raise sufficient revenues to remain financially viable, so that continuity and quality of service is ensured.

In addition to the above three principal objectives, there are some supportive objectives. One is to raise revenue by taxing energy products, either to finance energy related facilities such as highways, or to raise revenue in general. Some other objectives are: energy conservation, reduce environmental degradation, reduce deforestation etc. There also may be specific objectives such as promotion of regional development (e.g., local mining activities or rural electrification or support for specific sectors like export oriented industries), as well as considerations of other socio-political, legal and environmental objectives or constraints. As these various objectives are often not mutually consistent, a realistic, integrated energy pricing structure is required to permit trade offs amongst them.

Conservation, Substitution and Demand Management

A result of energy and oil policies in the last 30 years has been a restructuring of the global economy and less reliance on oil. For the world as a whole since the early 1970s, there has been a nearly 40% reduction in oil consumption per unit of GDP in real terms. The reduction has been most impressive (about 50%) for the industrialized countries. It has been

smaller (24%) for the rest of the world. Overall world economic growth is now much less dependent on oil than it was a generation ago. On an aggregate basis, oil consumption per unit of GDP fell from about 1.5 bbl to 0.9 bbl for the total world. However, while it fell from about 1.4 bbl to 0.7 bbl in the industrialized countries, it fell from about 2 bbl to 1.5 bbl in the rest of the world. This shows that great potential remains for the reduction of oil use in the world outside the industrialized countries. Oil consumption per unit of GDP in the rest of the world could decline from about 1.5 bbl at present to less than 1 bbl in the future.

Worldwide, oil has already been substituted in many sectors. Alternative sources of energy and renewable have been under development for a few decades; some have been successful in various sectors of the economy. Industrialized countries are also carrying on with their public policies to reduce oil consumption. A reduction is likely in the purchase of vehicles that consume fuel at high rates. Energy conservation, oil substitution and other measures are being encouraged. High prices themselves will suppress oil demand.

'Deregulating energy supply sectors and enhancing market competition are one of the prevalent issues of public policy in developed countries for increasing efficiency of economies. In Europe, for instance, the markets of electricity and natural gas have been deregulated for the last decade. Power lines as well as gas pipelines are networked through all of Europe, and not only firms in a single market but also those in both markets compete with each other. In the US, deregulation in the power industry has been accelerated, although the effort has been hampered possibly by a failure in the deregulation process. In Japan, the deregulation of both electricity and natural gas markets is underway and progressing gradually.' (Nakada, 2005)

Oil importing developing countries are continuing to follow similar energy and oil policies. As in the industrialized countries, their oil using capital and consumer goods are now more fuel efficient and utilization of natural gas is expanding.

Indian Oil Industry, more particularly PSU Oil Companies will have to keep in mind that the high demand growth recorded in the past may not be sustainable. There would not be a consistent rise in demand, even though there would be growth in income and income elasticity of demand for oil would be less than one but positive. In marketing terms, it would not be a sellers market. It would not be a supply driven market for all the products. Marketing strategy has to be product specific and to be driven by economics, which has to be constantly worked out. This is a significant outcome of globalization of oil Industry and it throws a challenge to be met by the players in the Industry. It would not be a volume game; it will be a

value game, faced with risk and uncertainty of the market. Market in a wider sense will be the general market, in which Oil Industry will be a sector. Future reform policies need to take these market developments into account.

Organizations like Petroleum Conservations Research Association (PCRA) under Ministry of Petroleum and Natural Gas and Bureau of Energy Efficiency (BOEE) under the Ministry of Power have to get into equipment and application of energy for enhancing conservation.

Product Specifications, Investment in Refining & Bio-fuels

Refineries throughout the world are increasing investments to deal with changing specifications for gasoline and diesel fuel. The global refining sector has begun to emerge from a short period of tight capacity and high margins with refining investments being made all over the world. After a year of remarkably profitable margins, refiners are facing a somewhat more bearish market place. Meanwhile, petroleum product demand continues to grow even as the specifications for transport fuels in particular become more complicated. (Mueller, 2007)

Refineries in India in coming years will expand distillation capacity; add coking or hydro-cracking capacity, which will enable them to run heavier and less expensive crude. Refiners will be concerned with maintaining enough production to keep up with growing demand.

For the third year running, refiners enjoyed healthy margins in 2006. There is no reason for this to change in 2007 because the supply demand balance for refined products would remain tight. Product demand is expected to continue to outpace capacity growth for the immediate future. The only short term solutions will be for refiners to raise utilization rates, which already are historically high, or use lighter, more expensive crude to produce more gasoline.

Compounding the effects of ultra low sulfur implementation is the fact the oil marketing companies now must add ethanol to gasoline. Demand for ethanol currently exceeds capacity to produce the fuel, requiring substantial levels of imports. Recently in US spot market, ethanol prices hit a high of $ 2.50 / gal, which was 80 cents per gal more than wholesale gasoline. During summer of 2006, spot prices hit $ 3.35 / gal for ethanol.

Bio fuel availability is subject to short term climatic condition. Weather in August is critical to the soybean production in the US, oilseeds output in India and crude palm oil production in Malaysia and Indonesia. If weather remains favorable in these countries, oilseed productions will increase, resulting in an interruption of the bull market. However, a hostile climatic condition may flare up the prices on squeezing supply. There has been a surge in demand for fuel, chiefly from the EU countries. The EU has been

importing vegetable oil from South America for producing bio-diesel as refined rapeseed oil is used for direct injection into trucks as fuel. Consequently, the demand of raw materials producing bio-fuel has been increasing across the globe. India is also planning to make 10 per cent *ethanol blending* mandatory by 2008, subject to availability. Globally, bio-diesel production based on farm products such as *cereals, sugarcane,* oilseeds are influenced by the bio-fuel policies announced by the US, Brazil, Canada, Argentina, China and India. Since these countries have embarked on many programs based bio-diesel, demand for maize, sugarcane, oilseeds will skyrocket in the near future.

Indian bio fuel evolution is still at its nascent stage as the chronology given below would show:

1975: India begins examining the feasibility of blending ethanol with petrol; sets up 6 technical committees and 4 study groups.

1980: The Indian Oil Corporation conducts trials on 15 passenger cars & 21 two & three wheelers using 10% and 20% anhydrous ethanol blends.

2000: The Ministry of Petroleum and Natural Gas initiates pilot projects in 3 Oil Depots (2 Maharashtra & 1 Uttar Pradesh) covering 350 petrol stations to study related aspects of blending ethanol with petrol and its use.

2002: The government mandates blending of 5% ethanol in nine states and four Union Territories with Rs 0.75 excise duty exemption. A Committee on Development of Bio-fuels is constituted.

2003: The Committee recommends strengthening the ongoing program of blending of ethanol with petrol & launching a National Mission on Bio-diesel based on jatropha plantation. Meanwhile the National Auto Fuel Policy recommends commercialization of bio-fuel vehicles.

2004: Problems related to feedstock supply of molasses force the Indian government to suspend mandatory blending of ethanol in petrol.

2005: The resurgence in sugar and molasses production results in renewed interest in ethanol program. The government fixes purchase price of ethanol by oil companies at Rs 18.25 per liter.

2006: The government announces a Bio-diesel Purchase Policy, fixing the purchase price for oil companies at Rs 25 per liter. Initially, 5% bio-diesel is blended with diesel, with plans to extend the blending to 20%.

2007: The National Bio-fuels Draft Policy envisages utilization of a wide

range of locally available bio-crops for production, setting up of a National Bio-fuels Development Board and revising the indicative target for 5% and 10 % bio-diesel blending in diesel by 2012 and 2017 respectively. A Bio-fuels Mission focusing specifically on pongamia and jatropha is also launched

Gas Pricing

Gas pricing as of today is a maze of various pricing methodologies in vogue. There are administered prices for PSU producers and marketing companies. Private companies are marketing gas at market price. NELP producers are selling gas at their contractual price. There is a move to free the gas pricing and make it market related. The justification for this is drawn from the fact that large part of gas, specifically LNG is to be imported. Secondly, large part of the indigenous reserve is in the hands of private producers, who would normally be interested to get a value for their product. They also need to invest huge capital for laying pipelines to bring gas to market. The economics of gas is sensitive to the initial investment that is required across the gas value chain. Thirdly, price elasticity of demand for gas in India would be high as gas is currently being used as alternate fuel by most fertilizer and power producers. XI Plan will witness a tumultuous process of gas price stabilization. From the regulatory point of view a pipeline policy is already in place. Secondly, the scope of downstream regulator includes gas and pipeline. Thirdly, hectic political and legal battle lines are being drawn on the issue of pricing of KG basin gas of Reliance Industries.

Reforms in gas pricing are closely associated with reforms in power and fertilizer sector. Reforms in these two sectors pose serious complications, which is outside the scope of this study. An overview of the issues and challenges in the Gas sector with experiences of reform in other countries is available in Jensen, 2003 and Foss, 2005.

Studies suggest that natural gas prices are converging upward, both in conjunctions with rising oil prices and across global gas markets. Analysts foresee oil price equilibrium at $ 60 per barrel for Dubai crude. Due to fuel switching, gas prices are bound to rise as well, although they are capped by competition from coal and nuclear power. Meanwhile, LNG prices will be driven by high construction costs, the re-entry of the US into the LNG market, shortfalls of contracted Indonesian LNG supplies and Qatar's becoming the world's biggest LNG supplier. The Qataris know that they hold most of the cards in the near term and intend to take advantage of it, asking for higher prices and diverting cargoes to the highest paying markets, paving the way to become the price setter in the world LNG scene.

For years, UK gas prices were the lowest, followed by US and European price, while Asia had the highest gas prices. In 2005, the US and European prices converged at higher levels, leaving Asian prices behind. In 2006, a new trend emerged, with US and UK gas prices converging. Meanwhile Asian prices have resumed their threshold above US and UK prices. With a real linkage in markets, new spot markers in the Atlantic Basin have emerged as the reference price in the East. Traders rely upon US and UK gas prices as the reference price for Asian and Middle Eastern LNG spot prices.

The Asian LNG market is experiencing increased tightness. Middle East producers can send cargoes to both the Atlantic Basin and the Asia Pacific Region. New Asia Pacific supplies can move within Asia and to the US West Coast. Consequently, suppliers are likely to ask for prices that compete or more likely to exceed the prices they could obtain in the highest paying market, be it the Asia Pacific, Europe, or the US. This essentially means a connection of markets despite the disparate location of the sellers. It also signals a fundamental shift in the global gas markets in both pricing and trade flows.

Asian buyers are negotiating with Qatar for long-term diversion to Asia of western volumes. Total diversion could reach 15 – 20 million tones by 2012 for Japan, South Korea and Taiwan, but more volumes could be diverted to China and India if international prices are paid.

With the exception of Qatar, the Middle Eastern supplies are all booked. In the Asia Pacific, the realistic potential suppliers by 2015 are: Russia's Sakhalin 2 (Train 3), Indonesia's Tangguh (Train 3), Australia's Northwest Shelf, Gorgon, Pluto, Scarborough and Browse basin. India probably will resist making long term commitments at high prices, but Indian buyers will have to come to terms with that.

There has been series of litigations on the issue of pricing of KG gas. Reliance Industries Limited (RIL) will be the first major private gas producer in the country, set to bring in almost 80 million standard cubic meters per day of gas, doubling the country's gas production. Government of India (Group of Empowered Ministers) decided in September 2007 a pricing formula of KG gas, which has four basic elements: (a) a floor price of $ 2.5 per million British Thermal Unit (mmbtu); (b) linkage to benchmark Brent crude (with a band of $ 25 and $ 60 per barrel); (c) a dollar rupee exchange rate (based on the average of the last twelve months) and (d) 'C', the biddable component.

The Government has decided on a floor price of $ 2.5 per mmbtu for all gas contracts during 1999 to 2006, i.e., this applies to all bidders who have acquired exploration blocks under NELP bidding rounds I to VI. This

will be the minimum base price which the government will take into account while calculating its share of profit. According to norm under NELP, the government's share of profits is obtained from the profits earned by the producer by selling the gas. This is a biddable item under the contract. (Banerjee, 2007)

Growth with Social Justice

If Oil Sector has to support the spirit of national agenda, then Oil Sector has to provide the required fuel, liquid and gas, to sustain the growth, in the manner it is desired. If growth has to be dispersed and decentralized, then fuel has to be made available at those localities and pockets with suitable and cost effective logistics. Oil Industry has to support the pattern and style of growth, be it agro based, decentralized industrial township, special economic zone based, rural oriented or whatever that might be directed at the national policy level.

But the instrumentalities for achieving social justice and equity will not be the conventional and directed ones as most of these have been now. Policy instruments will be in the nature of monetary policy, fiscal policy, trade policy, industrial policy, credit policy and activities in social sector and so on. All these policies will have instruments which will work through the market.

Growth with social justice in the context of reforms initiative calls for a type of governance, where government would be a facilitator of wealth creation with dominant presence in social sector and industries holds the key to growth. In a democratic country like India electoral politics has to support the economic philosophy, which poses a challenge to policy makers and leaders.

Section 8.3 – Recommendations

Review of reforms in oil sector in the context of national agenda brings out a great deal of synchronization that has taken place at the policy making level. But there are functional areas of improvement in operational efficiency and productivity. Some of those domain related action points have been suggested in this section.

1. Remove the licensing system required to market any petroleum products. That would bring competition into the market. Competition would optimize price and service and other forms of efficiencies, which the reforms process aims at. There would however be some regulation, to prevent market distortions. Those regulations would be rule based rather than discretionary; which normally the Regulator would administer.

Today, there is a condition stipulated for investment of Rs 2,000 crore in infrastructure investment in downstream assets for any one getting license to do marketing of auto fuels. This has been viewed as a barrier by some. But it also has positive features in terms of seriousness and commitment on the part of the marketing players. From the country's point of view, the condition is a means of attracting foreign or private capital to the sector.

2. One of the cardinal principles of competition is that firms have freedom to decide their price and output at an equilibrium level. There is perfect mobility of factors of production and there is no entry barrier.

It is significant that the PSU companies are allowed to operate in a commercial and professional line, for which managerial and functional autonomy are prerequisites. Few suggested methods of ensuring that are:

- Divest majority shares from the Government. Government may keep a golden share, which may entitle it to have a say in case of emergency, protecting national security and public interest. It is observed, 'even partial privatization, with the government retaining control, has yielded improved productivity', (Patnaik, 2006) Let the Board of respective Companies be answerable to shareholders and other regulatory bodies in the country.

- Key decisions like Investment planning, product pricing, appointing dealers and employee remuneration etc. are to be taken away from Government clearance. Let the Board be the final decision making body. Board can have an economic advisory council internal to the organization.

- PSU Oil companies would have absolute commercial freedom to run their business. If at all they are to serve certain short term objectives, national or otherwise, those can be incorporated in their MOU, which all PSUs are signing with MOPNG every year.

Ahluwalia (2005, c) writes, 'a consensus is emerging on one important issue, and that is the need to give management autonomy to public sector enterprises as a key requirement for efficient functioning. There is no inherent reason why a public sector corporation should be inefficient, if it is run like a corporation. In particular, it must not be subjected to continuous interference from the government or bureaucracy, which demoralizes public sector management and dilutes accountability. Government should set out the corporate objectives of the enterprise and top management must be given the full degree of autonomy needed to achieve these corporate objectives.'

All the above suggested measures would make the downstream oil companies more efficient and more profit making. Then only, these companies can be expected to contribute to the growth of the economy,

keeping an eye for overall development with equity and distributive justice through their pan India and inter-sectoral presence.

3. Let all the PSU Oil Companies be converted into Energy Company (multi-utility firm). Each one of the companies, get into R&D and infrastructure building activities, so that by end XI Plan, these companies can provide an integrated energy solution to customers.

The traditional Oil Company model was based on vertical integration and asset ownership, i.e., a company would be involved in various aspects of fossil fuel processing, such as exploration, production, refining, manufacturing and distribution. Global energy companies are now creating new, horizontal, service based business models in the oil, gas and electricity sector bringing together energy trading, generation, distribution to providers and end-consumers. Apart from bringing in synergy amongst various forms and types of energy, these diversifications will keep the internal (organizational and functional) spirit dynamic and vibrant. If for example, a company is making loss in one segment of the business due to some unavoidable reason, as it is currently happening in Oil marketing sector, the loss can be compensated by making profit in some other segment. The staff in the company will get better avenues to fulfill their technical and managerial aspirations.

Studies have shown that in oligopoly energy market, as is India, with elasticity of substitution between energy and labor being less than unity, enhanced market competition in the energy supply sector promotes R&D activities for new energy technology. (Nakada, 2005) The new technology would have twin effects: a) decreasing carbon intensity, that is the amount of carbon emitted per unit of energy consumed, and b) increasing energy efficiency, that is the amount of energy consumed per unit of output.

Sir Mark Moody Stuart put it best a few years ago when he was chairman of Shell, "We need to meet our customers' needs for energy, even if that means leaving hydrocarbons behind". There are already signs world over that a clean-energy revolution is getting under way. Whether prodded by low carbon regulations or enticed by green subsidies, venture capitalists are pouring lots of money into low-carbon energy technologies, ranging from renewables to carbon sequestration. Even nuclear power, once thought dead, is getting a second look because it emits no greenhouse gases.

Old lags in the Industry have long quipped: "The 'stone age' did not end for lack of stone, and the 'oil age' will end long before the world runs out of oil."

These suggested measures will help towards low cost and diversified energy availability to the economy. That is how; the downstream oil sector can meet the energy needs of a growing economy. Efficiency in the use of energy will make the user sectors (like agriculture, manufacturing, transport etc) more efficient, which will enable them to provide their services at more cost effective way to their consumers. This is how the interest of the end consumers at large can be promoted.

4. Pricing of refined petroleum products is a commercial decision to be decided by Oil Companies. Oil Companies are best suited to determine the economic value of their product and the interest of their stake holders.

In case prices are to be restrained under certain conditions; that can be exercised through the Board of the companies.

Second, downstream Regulator is the right authority to apply any kind of restriction on the prices.

Third, as far as inflation is concerned, it is to be regulated by the monetary and fiscal policy measures. 'Oil shock does not change the nature of fiscal and monetary policy.' (Rakshit, 2005)

Fourth, State Governments can exercise certain influences through Essential Services Commodities Act, in case such adverse conditions arises which might call for any draconian measures.

There is an inherent conflict of interest between oil companies and rest of the country (as consumers of oil) with regard to the price of petroleum products. Oil price hike has been a subject of intense debate as has been examined in previous chapters (Chapter VI, Section 6.3, Chapter VII, Section 7.4.3). The oil pricing policy adopted so far has been marked by adhocism with high dose of political expediency, but their impact on the country's macro economy has been salutary, especially keeping in view the objective of growth with social justice. The policy of caution and circumspection with regard to price of oil can be followed, without affecting the financial health of the down stream oil companies.

Planning Commission (2006) has put the same as: "For India, the persistence of high oil prices does pose difficult choices between (a) passing on the price increase to the consumer; (b) lowering taxes on petroleum products; and (c) squeezing the oil companies. Each of these options has some adverse consequences and the Government has resorted to a combination of all three in the past twelve months. In the medium term, the only viable approach is to rationalize taxation on petroleum products and then pass on the bulk of the burden of higher oil

prices to consumers with targeted subsidies to protect the interests of the poor."

It may be worth mentioning that a free price regime does not automatically mean that retail price changes of petroleum products would be very frequent and would follow the price volatility of international market.

Complete pass over of effect of variation in international price of crude and petroleum products to the consumers may not be a prudent management of the oil economy. Not withstanding the above statement, periodic revision in prices, upward and downward as the situation demands, is a must. History of Indian Oil Industry provides lesson on this. In the aftermath of 1999 oil shock, domestic selling prices of oil products were revised 3 times during 12 months. Kerosene prices were revised twice. Price revision of course has to be an economic decision, cannot be left to any ideological predilection.

Supply side constraints and fiscal incidences are to be eased out. It is known that demand for oil products are price inelastic. The postponement of adjustment in selling price oil products may delay the inflationary build up in the short run, but it fuels inflationary expectation which gets translated into other sectors. As long as economy is growing in output and employment, it is better to spread out the price rise rather than blocking it. (Section 2.5.4 in Chapter II)

Even in US market, gasoline prices respond to changes in crude oil prices not fully and with substantial lags. Studies have shown that in US market, full adjustment of gasoline prices to changes in crude oil prices may take many weeks and a lag in the response of gasoline prices to crude oil prices may be caused by the cost of adjusting gasoline production and level of inventories. Profit maximizing behavior dictates that refineries adjust the gasoline production to change both the supply of gasoline and the price of gasoline when the price of crude oil changes. Once the refineries change the gasoline price, they must also change the supply of gasoline by either changing the production level or the level of gasoline inventory. Both alternatives may be expensive to implement over short period of time, leading to long lags in the adjustment of gasoline prices when crude oil prices change. (Radchenko, 2005)

5. Tariff levels and rates are to be maintained at a level consistent with national fiscal policy, suiting national priorities to be served through Oil Sector. Tariff structure should not be a barrier for import and export of products. Quota, quantitative restriction, import license, export incentive and canalization; all to be removed. Each of these measures, if at all required to be taken, should be in consonance with the national economic

policy. Restrictive and regulatory measures, if is required, has to be temporary and purposeful.

If Indian refineries need any tariff protection; that can be viewed by the Finance Ministry and Planning Commission, based on economic justifications and in line with international conventions. Views of trade bodies can be given due consideration, so that interest of Oil sector, if any, is not lost sight of. This is being done even now, as part of budget making exercise. Trade body like Petrofed may be functionally strengthened. Its research based views are to be recognized and given policy shape.

6. All subsidies are to be abolished. If any target population is to be taken care, that kind of targeted instruments of transfer payment are to be devised. Planning Commission (2005) has recommended subsidy dispensation through debit card to BPL households. Care has to be taken that subsidy should not distort the pricing of petroleum products, leading to its suboptimal use and diversion to non priority sector.

   LPG subsidy may be abolished forthwith. There is some justification in continuing Kerosene subsidy in the short term, as about 50 percent of rural household use kerosene primarily to light their homes. In the absence of substitution possibilities, a reduction in kerosene subsidy will lead to these households to experience a large welfare loss. The short term policy option would be to consider means by which the illegal diversion could be substantially reduced such as the use of kerosene vouchers. The longer term policy option would be to expand rural electrification network on a sustainable basis.

7. Remove the price difference between products which can be diverted for black marketing or for adulteration. Cases in point are: price difference between Kerosene under PDS and Diesel, LPG for domestic and LPG for commercial use. A conservative estimate has put that 'about 25% of the kerosene supplied for the PDS gets diverted to the black market for sale to unauthorized users and for adulteration of other petroleum products'. (Rehman *et al*, 2005)

8. Make use of oil diplomacy to secure oil reserves in overseas oil fields. Initiatives already taken in this regard may be continued to its full use. Form, strengthen and work through Asian buyers block. Multilateral world bodies have to be so utilized that oil exporting countries may be asked to share a part of their income to promote an energy transition in poor households that would enhance their human development. It might involve levying an incremental price increase on petroleum that could be termed an 'energy – poverty alleviation' levy; then use the funds collected to

provide cleaner burning fuels such as kerosene or LPG for meeting the household energy needs of the poorest part of humanity.

9. Develop an 'energy efficiency policy' for household sector, involving government intervention and technological shift. (Reddy, 2003) Energy efficiency involves the replacement of inefficient technologies with efficient ones and fuel switching from non-renewable to renewable technologies. Rising incomes can lead to fuel shifts.

   In the choice of fuel, not only fuel prices play a role, but also the price of devices and the convenience of use. If the efficient options are implemented, government saves money in terms of reduced oil imports, cost for fuel for power generation and the investment for new power plants and reduction in cutting forests. The consumer saves money in terms of reduced energy bills and the society saves money through reduced pollution levels.

Exhibit - 23

Road ahead .....

- Remove licensing system required for marketing of petroleum products
- Divest majority shares of Govt. of India in PSU Oil Companies
- Empower Board of PSU Oil Companies to take decisions
- PSU Oil Companies be converted to multi-utility energy companies
- Free pricing of refined petroleum products from Government control
- Tariffs on petroleum products to be in line with fiscal consideration
- Remove LPG subsidy
- Let Petroleum Regulatory Board promote fair competition
- Make use of oil diplomacy for energy security
- Develop energy efficiency policy for household sector

Summary

Exhibit - 24

Significant Findings

- Oil Sector reforms has moved along side the economic reforms process.
- These initiatives are continually interacting with the economy, whose profile itself is constantly changing, as the economy is growing.
- In most of the cases, Oil Sector has supported and promoted the economic reforms at the national level.
- However, in two cases, Oil sector has acted in adversarial ways.
- pricing of petroleum products
- privatizing the Oil PSUs.

To summarize, globalization and reforms are not unmixed blessing. Globalization and reforms are only conditions of wider market, ideal for free competition. There is no text book rule of law for globalization. Each country in the global world would have to take care of its own interest and each sector will have to be seen in the light of the conditions and objectives set for it. Therefore, Oil Sector in India has to be alive to its emerging imperatives as discussed in this thesis. National priorities and evolving state of economy has to be constantly kept in view.

Reforms in India's Oil Sector are continuing process. The agenda laid out here is just a medium term blue print. The analyses in the previous Chapters bring out linkages and impacts that oil industry has and creates to and in other parts of the economy. This will be of use to planners, policy makers and leaders of Indian Oil Industry and those at the national planning level.

Recap: Chapter VIII

Oil industry is slowly but steadily moving away from conventional skill to technical skill. The young entrants into the Industry are equipped with high profile and multi level skill. They have international exposure. Their working style and professional aspirations are something that can be called path breaking. XI Five Year Plan will have the opportunity of dealing with skilled manpower developed by specialized institutes like Indian School of Petroleum (ISP) and University of Petroleum and Energy Studies (UPES). Educational platforms like ISP & UPES have brought about a revolution in education, experimentation, project management and learning environment in Oil and Gas sector in the country. Two more such specialized oil Industry linked Institutes are in the offing: a) Institute of Petroleum Management, Gandhinagar, promoted by Gujarat State Petroleum Corporation; b) Rajiv Gandhi Institute of Petroleum Technology in Uttar Pradesh by PSU Oil Companies under the aegis of Government of India. Shell is planning to set up an R&D centre at Bangalore.

Worldwide, Oil Companies are going to invest heavily in knowledge management including automated online operation monitoring and information sharing. Focus on risk management and operational efficiencies would drive technology spending by Oil and Gas Companies. Effective and efficient risk management necessitates real-time access to data related to all phases of oil and gas sector such as geological surveys, seismic studies, and oil well drilling.

Other key factors leading to greater technology spending by oil and gas companies include regulatory compliance, integration of new business units as a result of mergers and acquisitions, environmental compliance of fuel quality and better management of marketing functions within the service station segment.

With regard to information technology spending, the oil and gas sector is likely to hike up investment in network design and implementation, data transport services, storage services, and wireless capabilities. The need to connect multiple sites - both inland and off-shore facilities - is expected to continue to drive oil and gas companies' spending in wide area network services utilizing wireline, wireless, and satellite platforms.

Oil and gas companies are anticipated to respond more favorably to customized IT/telecom solutions that often require developing partnerships with other best-of-breed hardware, software, and services providers.