

## *Chapter-7*

# Recommendations and Suggestions

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## Chapter-7

# Recommendations and Suggestions

This section of the report distills the issues discussed in earlier chapters and also examines some strategic issues that will impact the future development of the GCC petrochemical industry. This study has already ascertained the following:

- GCC countries are actively trying to promote private sector investment in sectors influencing industrial activities and most prominently petrochemical sector.
- Crude oil production will increase, however, at relatively slower rates. Therefore, associated gas and hence, ethane will continue to be made available in the future but in relatively smaller quantities.
- Most of the major developments taking place in the region center around the production of non-associated gases.
- Pressure is increasing on the Governments of GCC countries to undertake reforms in order to address issues related to social welfare.
- The unemployment issue is being tackled by GCC countries by introducing laws that require expatriate workers to be replaced by locals over defined period of time.

In addition to these issues there are number of external issues that will also have an influence on the development of petrochemical industry in this important region. These issues are pertinent, as the bulk of the industry is

and will continue to be export driven. Therefore, any development taking place in the industry in other regions, particularly those which are GCC's core markets, are bound to have an impact on the future of GCC's industrial development. This section elaborates some of these issues and attempts to identify critical success factors for the industry to insure sustained growth for long term.

## **7.1 STRATEGIC ISSUES**

What are the strategic issues confronting the petrochemicals industry in the GCC countries? These are issues that are expected to have an impact on the industry fundamentals in the region and therefore, may impact current and future investment decisions. It is important for planners to understand these issues, in order to develop or modify their strategies that ensure expeditious development for robust projects.

However, before addressing these issues, it is necessary to highlight the requirements of potential investors for making strategic investment decisions in GCC petrochemical sector. Amongst many considerations, some of the key ones are:

- Availability and cost of feedstock on long-term assured basis
- Growing market for products
- Acceptable pricing and margin for the products
- Logistics (particularly when the bulk of the products are to be exported)
- Availability of competitive financing options
- Stable investment environment
- Other incentives

The extent to which these will impact developments will vary from region to region, and also from country to country within those regions. This is even

more critical in the case of GCC countries, where certain countries are rich in hydrocarbons, while others have a large population base, hence having a large domestic market. Even among those countries that are rich in hydrocarbons, some are rich in gas reserves while others are rich in crude oil reserves. Therefore, it is not meaningful to present issues that are applicable to all the countries in the region as a whole. If we re-look at the GCC countries (Saudi Arabia, Kuwait, Qatar, UAE, Oman and Bahrain), *Saudi Arabia, Kuwait, Qatar* and *UAE* are OPEC member countries and rich in hydrocarbon reserves. Despite having these resources, *Qatar* is rich in gas but have relatively low crude oil reserves. Conversely, Saudi Arabia has the largest crude oil reserves, but has relatively moderate gas reserves. Therefore, if we can further classify the GCC countries, as those which are *gas rich* (Qatar and Saudi Arabia) and those which are *rich in crude oil* (Saudi Arabia, Kuwait and UAE) countries it can help in delineating the issues somewhat better. The other GCC countries *Bahrain* and *Oman* are expected to rely on the other countries for their hydrocarbon needs.

There are some underlying factors that are common to most of the countries within these categories. It should also be mentioned that in the list of factors identified earlier, some would pertain to the region, while others are influenced by the developments in other part of the world. This issue is particularly important for the GCC countries, as the region has, and will continue to develop export oriented projects. Therefore, developments, especially in Asian markets are of extreme importance to the region's petrochemical sector.

The discussion in the following sub-sections will focus on issues related to the regional development as well as global issues which have impact on GCC petrochemical industry. It is noteworthy here that the industrial developments in GCC countries are based on critical support from the governments of individual countries.

### **7.1.1 Reliance on Hydrocarbon Exports**

Except Oman and Bahrain all the GCC countries have and will continue to rely on crude oil and gas exports for bulk of their earnings. Saudi Arabia, UAE, Kuwait and Qatar are working for diversifying their economies by promoting industrial growth and trying to somewhat reduce the share of oil export in total exports.

Among these countries Saudi Arabia has been most successful in this mission. Over the last four years, the Saudi economy has almost doubled in size to \$348 billion (2006) and the real GDP grew by 4.2 % in 2006. Non-oil industry was the fastest growing sector at 10%, spurred by higher petrochemicals and metals production. Non- oil private sector GDP growth was 6.3% in 2006 and the revenues for 2007 are budgeted at SR 400 billion. Almost 90% of this total is likely to be derived from oil. An average price of \$42.5 per barrel for Saudi oil (equivalent to \$47 per barrel for Brent) and production of 8.9 million b/d would be sufficient to meet the budgeted total.

In UAE, Kuwait and Qatar, the share of oil and gas in overall export revenues remains 90 - 95% over last ten years. These countries are involved in exporting hydrocarbons in one form or the other (crude oil, refined products, condensate, LPG, LNG etc.). They are all exposed to crude oil price movements and to some extent been benefited by that. There is possibility that GCC region may see steadier oil revenues as OPEC also mentioned that it intends to ensure that a stable price regime persists in the future.

#### **7.1.1.1 Recommendations**

It is expected that the fortune of GCC countries will continue to be dependent on the crude oil price movements and are expected to experience relatively more stable revenues in the future as compare to past. Therefore, the expansion of petrochemical activities in GCC

countries has to be used strategically to diversify the economy. In some of the cases, it has been stressed in their long term strategic planning like Saudi Arabia, Qatar, Kuwait and to an extent UAE.

### 7.1.2 Pressure on State Budgets

Despite substantial export revenues from hydrocarbons almost all countries in the region have experienced substantial budget deficits in the past. In the case of UAE even it was as high as 10% of the GDP. The situation from the year 2000 onward has improved and now all the countries have achieved the budget surplus (See Table 7.1), although the surplus varies from 19% to little less than 1% depending on the size of economy and its export portfolio.

**Table 7.1 .1 Budget balance of GCC countries in 2005**

GCC Countries	Budget surplus (% of GDP)	Public Debt (% of GDP)	FOREX reserve (months of import cover)
Saudi Arabia	10.4	65.3	8
Kuwait	19.1	21.1	8.5
Qatar	8.6	34.6	6.6
UAE	18.3	8.4	4.1
Oman	4.8	13.1	5.5
Bahrain	0.7	34.3	3.8

Sources: IMF/IIF estimates, 2006

#### 7.1.2.1 Recommendations

The availability of resources for promoting further industrialization will continue to remain a function of the governments' earnings. Although, the GCC governments shall continue to provide support required to promote industrialization but at the same time they should encourage the private sector investment by rationalizing over all policies through appropriate pricing and various buy-back schemes like build-operate-own (BOO) or build-operate-transfer (BOT) arrangements. In most of the recent policy announcements of GCC countries emphasis has been given on private sector investment and most of the governments, even the smaller GCC countries like Bahrain and Oman, are creating the investment environment which are

conducive to private sector investment. The route followed by these countries is also through encouraging petrochemical industry expansion.

Bahrain and Oman have depleting hydrocarbon resources even though they are working closely with other GCC countries to share their hydrocarbon resources. For example, 85% of oil refined at the Sitrah refinery in Bahrain comes from Saudi Arabian oilfields in which BAPCO has 50% share. Similarly, most of the new Bahraini petrochemical projects will be dependent for feedstock on imported gas from Qatar.

### **7.1.3 Petrochemical Feedstock**

In section 6.3 of Chapter-6 it has been recognized that feedstock sourcing and pricing policies can provide a significant cost competitiveness advantage for petrochemical producers in the GCC countries. Hence, the future availability and pricing policies of ethane, LPG and naphtha is of critical importance to establishing a competitive petrochemical industry.

#### ***Ethane***

In the GCC countries, there are a large number of projects planned to use ethane as a feedstock advantage over Asian producers which must typically compete with domestic and industrial consumers for access of gas. Additional projects can be expected to be announced as upstream expansions will further increase natural gas production over the next decade. Interestingly, at global scale, ethane will remain a smaller influence on overall petrochemicals feedstock supply than naphtha. At high oil prices, the cost benefits achievable by those using ethane feedstock can be significant.

Ethane was initially valued in the GCC countries at approximately its separation and transportation cost. However, the increasing commercialization of natural gas within the GCC countries has resulted in the creation of alternative markets such as LPG, which is expected to lead to

gradual increases in gas and ethane pricing over the next decade as competition for hydrocarbons increases. Examples of such increases are already evident in Qatar which has employed bidding process to price ethane supplies. This has resulted in pricing significantly above Saudi pricing, which has historically set the “floor” for ethane pricing.

### **LPG**

LPG is expected to remain a supply driven commodity business. Significant increase in availability are expected in the GCC countries, linked to increasing production of oil and gas such as ongoing development of South Paras, Qatar. However, a significant proportion of this additional production is expected to be exported to Asian markets where it will be consumed in high value fuel use such as cooking and heating. Strong demand growth in these applications is expected in the huge developing markets of India and China. As such international LPG pricing will continue to be strongly linked to competition with other fuel and inevitably crude oil price movements.

Historically, the price floor for LPG has been set by the ability of some petrochemical producers to substitute LPG for naphtha during summer period when LPG supply outstrips demand. Overall, the existing LPG supply-demand dynamics will remain in place, although selective petrochemical investment using LPG as dedicated feedstock to meet increasing requirements for propylene may occur, close to significant production sources and where feedstock price discounts are offered such as Saudi Arabia.

### **Naphtha**

Sustained growth in refined product demand is expected to result in significant refinery capacity additions either through expansion or building grass root refineries in the next decade across GCC countries. At the same time, some countries like Saudi Arabia and Qatar are constructing the integrated refinery petrochemical complexes to capture synergies across the



interface. Additional quantities of condensate containing a significant naphtha content are also expected to be produced in GCC region as a result of increased gas production.

Several investment projects using naphtha as a feedstock in the GCC are anticipated in coming years but these facilities will typically rely upon economies of scale or some of their feedstock slate being based on lower cost raw materials to offset the freight disadvantage associated with shipping bulk petrochemicals or polymers.

#### 7.1.3.1 Recommendations

- The GCC countries should adopt enhanced gas recovery techniques and reduce flaring at the well-heads to the minimum possible.
- *The price of ethane should thus be set at such level that it provides an incentive for investment. As the cyclical nature of the petrochemical business continues to play a crucial role in the overall profitability of the petrochemical business, margin sharing formula could be developed such that neither the petrochemical plant owners nor the feedstock provider are adversely disadvantaged at any given point of time.*
- It is essential that downstream projects planned in the gas rich GCC countries such as Qatar and Saudi Arabia materialized in order to ensure that the desired volumes of gas are produced to extract the lower ethane content in non-associated gas.
- The option for optimal location of such petrochemical facilities should be explored. There is potential for furthering synergies between various petrochemical plants if located close to each other. It is recommended that a cluster approach be used in locating the plants to

ensure maximum sharing of resources. The numerous advantages in developing petrochemical plants as clusters are evidenced in Al-Jubail and Yanbu in Saudi Arabia.

#### **7.1.4 Petrochemical/Refinery Integration**

Opportunities for closer refinery –petrochemical integration will inevitably be driven by a desire to improve economic returns from existing or new assets. The primary opportunities for petrochemical/refinery integration include naphtha for ethylene cracking or aromatics production and propylene extraction from FCCs.

Since the GCC's petrochemical industry has historically been based around a feedstock cost advantage in ethane and to a lesser extent LPG, there have been limited need or interest in integration with refineries. Most of the refineries in the GCC countries are relatively small scale and simple, although there are some notable exceptions like KNPC's refinery at Mina Al Ahmadi in Kuwait and SASREF at Al Jubail, in Saudi Arabia which are integrated with petrochemical units where there is extraction of either propylene or aromatics. But it should be noted that rising demand for refined products is encouraging the construction/ expansion / upgrading of refineries in the GCC countries, providing an opportunity to integrate petrochemical facilities as well. Notable examples include PetroRabigh integrated refining and petrochemical complex and Ras Tanura Integrated Project. The west coast Rabigh refinery is in partnership with Sumitomo Chemical, turning it into a full conversion configuration including petrochemical capacity. The Petro-Rabigh joint venture will begin production in 2008. The Ras Tanura petrochemical joint venture will be operationally integrated with Saudi Aramco's Ras Tanura Refinery complex and its Ju'aymah gas processing plant, two of the largest facilities of their kind in the world. These two facilities will supply feedstock to the joint venture and continue to be owned and operated by Saudi Aramco.

#### 7.1.4.1 Recommendations

The GCC petrochemical industry has historically been based around a feedstock advantage in ethane and to lesser extent LPG, with liquid petrochemical feedstock such as naphtha typically being exported to consuming regions such as Asia, due to more attractive freight economics than shipping petrochemical derivatives. In contrast to the GCC, there is higher integration between Asian refinery and petrochemical facilities with many large sites already exploiting synergies, like Reliance's facilities at Jamnagar in India. The initiative taken by Saudi Aramco, as mentioned earlier, is a strategic decision for creating the synergy at both the sites in Saudi Arabia. It recommended that other GCC countries should also take the necessary step for integrating their refinery with petrochemical complexes in order to achieve better economies of scale.

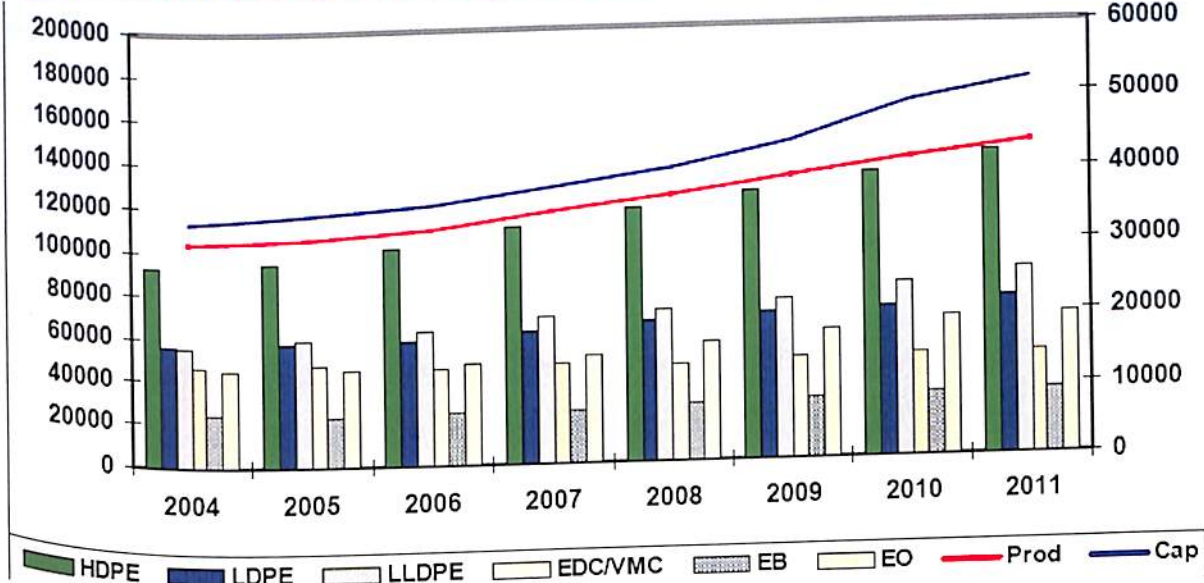
#### 7.1.5 Demand and Supply

The growth of ethylene demand directly mirrors the growth of polymer derivatives. The continuing expansionary economies in the major market areas, as well as, new market growth in the developing countries had provided major growth for PE, PVC, and Polyester. Figure 7.1 presents data regarding global demand for ethylene derivatives. The period of strong margins is continuing and expected to result in a very broad peak lasting at least through 2007 and likely into 2008.

Gross petrochemical demand in Asia is extremely dependent on China's market, as it is the largest consumer of most petrochemical products in Asia with high demand growth rate. China's demand for petrochemical products is also dependent on the broader global market as products produced not only serve domestic demand, but are used in manufacturing and packaging finished good for export as well. Other Asian countries, such as India,

Thailand, Indonesia and Vietnam, have also increased demand. India and Vietnam show a strong demand growth for petrochemical products, higher than the GDP growth, as their current per capita consumption for petrochemicals is relatively low. Another growth factor is the increase in the manufacturing of finished goods for export particularly in Vietnam where labor costs are much lower than in China, and the migration of some manufacturing.

**Figure 7.1 Global Demands for Ethylene Derivatives (thousand metric tons)**



On **Primary Axis** (LHS) Prod (Production) and Cap (Capacity) has been shown  
 On **Secondary Axis** (RHS) Ethylene Derivatives Consumption has been shown:  
 HDPE: High Density Polyethylene; LDPE: Low Density Polyethylene; LLDPE: Linear Low Density Polyethylene; EDC/VCM: Ethylene Dichloride/Vinyl Chloride Monomer; EB: Ethyl Benzene; EO: Ethylene Oxide

Source: Dewitt, 2006 Ethylene Annual

On supply side, Asia over the past ten years, has built up huge petrochemical capacities to substitute imports. Several countries in Asia, namely, South Korea, Taiwan, Thailand and Malaysia, have become self-sufficient. Other countries, like, China, India, Indonesia and Philippines, have increased local supplies but are limited by several factors and have not become fully sufficient. Japan's petrochemical industry has suffered from declining competitiveness in commodities since it does not have feedstock cost

advantage nor low labor cost in downstream productions. Japan, long established as an export centre, has shifted its focus onto the research and production of specialties chemicals rather than the export of commodities. Singapore, as a small country, has low domestic demand for all products. However, it has exploited its location, oil and refined product processing and trading position to establish itself as an export centre for petrochemical products, serving mostly Asian deficits.

In Asia, increasing demand has outpaced capacity expansion and region has become net importer of almost every petrochemical product. These shortfalls have been supplied by other regions such as North America, Western Europe and Middle East. The GCC countries have increased their position in Asia due to feedstock cost advantage. There are further expansions planned in GCC countries which target Asian markets, China in particular.

The demand and supply issue is not so simple. The discussion in the above paragraphs supports the GCC petrochemical expansion and investment and can be considered as strategic decisions on the part of petrochemical producers and the local government to exploit the demand and supply situation of Asia particularly China. But there is strong possibility of occurrence of some alternative trends. These alternatives could be posed in the form of scenarios such as below.

- China's demand does not increase as much as it is projected.
- China's demand keep growing strongly but there is insufficient supply from GCC countries due to some geo-political reasons
- GCC's free trade agreements with USA, European Union reach to a fruitful stage such that GCC countries finds accessible markets in other part of world (rather than China), the demand-supply dynamics from both Asia and GCC countries will decide the future course of action.

### 7.1.5.1 Recommendations

- The GCC is expected to have substantial surplus in various petrochemicals produced from natural gas or light hydrocarbon feedstock such as ethane and propane, with Asia, Western Europe and in time, North America targeted as the main export markets. The GCC should not be as dominant in petrochemicals produced from heavier feedstock, although the region's large and growing refining base should increasingly support aromatics production. In order to maximize the competitive advantage, GCC producers should also prefer to export styrene and para-xylene in preference to benzene and PTA respectively.
- It is essential that the GCC producers establish a firm foothold in the main markets of Asia and Europe. Their presence should not be restricted to just having sales offices, but they will also need to participate in developing new markets and other customer support efforts.
- GCC in coming decade is going to be a net exporter of a number of petrochemical products, which will require substantial efforts in arranging economical logistics to ship these products to the destination markets. To date, this has not been a major bottleneck, though it could easily become one if port and transportation infrastructure capacity is not increased in step with the rising production volume.
- GCC countries should also stress on promoting domestic consumption either through export oriented production or through import substitution scheme.

### 7.1.6 Cost Competitiveness

The cost competitiveness of GCC petrochemical industry has been discussed in detail in section 6.3 of Chapter-6. On the basis of comparative analysis

carried out in Chapter-6, it has been noted that cost competitiveness is one of the strategic issue of this study.

The cost competitiveness of GCC producers relative to their counterparts in other regions, especially in Asia, are expected to influence market behavior, investment and consolidation of the industry. With region's favorable pricing policies for NGL feedstock, GCC petrochemical producers continue to remain highly cost competitive in producing the major ethylene derivatives, including MEG, Polyethylene and polypropylene and styrene. However, regional production of aromatics and its derivatives is not expected to enjoy such a cost competitive advantage relative to Asian facilities. Thus, from a generic strategic point of view of GCC producers, more cost competitive opportunities lie in product chains that are dependent on ethylene raw material.

It has been noticed in the cost comparison exercise that Saudi Arabia leads the Middle East in developing polyethylene capacity while Iran and Qatar are also emerging as major producers amidst exploitation of their large natural gas reservoirs. It should also be noted that the scale of GCC investment in LLDPE (linear low density polyethylene) and HDPE (high density polyethylene) are quite high as compared to LDPE (low density polyethylene) for the strategic reason that relatively low growth is expected in LDPE due to maturity of most LDPE application and ongoing substitution by LLDPE.

In addition to polyethylene investments, development of MEG (mono ethylene glycol) and styrene capacity in Saudi Arabia and Qatar are expected to grow significantly, with large scale plants harnessing the region's ethylene production cost advantage to competitive environments and profitability margin expected for selected major producers.

### ***Impact of Saudi Arabia Accession to the WTO***

Saudi Arabia gained accession to the WTO in December 2005. The country is working towards gradually lowering trade barriers. The highly debated

feedstock pricing policies were of major concern for any bilateral trade agreement for Saudi Arabia with EU and USA. Since feedstock is available at the same price to anyone willing to invest in Saudi Arabia, the policy cannot be considered discretionary and therefore, did not fall into the realm of the WTO concerns regarding preferential treatment. This issue has now been dropped from FTA discussions.

Saudi Arabia's preferential pricing policies for NGL feedstock are expected to continue to encourage investments in the country's petrochemical sector during a time in which the state is attempting to broaden the feedstock slate for the industry, partly due to rapidly decreasing availability of new ethane supplies from associated gas. The cracking of other petrochemical feedstock in addition to ethane gives rise to a wide range of co-products other than ethylene.

### ***Impact of Developments of in Natural Gas Base***

Several natural gas rich GCC countries have recently attracted various gas-based investments and regional states and private sector are continuously evaluating means of optimally exploiting such large gas reserve. Qatar is the front runner in the natural gas projects followed by UAE and Saudi Arabia. On the other hand, the oil rich countries are also trying to exploit the availability of methane from non-associated gas which is expected to grow. Developments in GCC natural gas base are driven by the large supply of low cost natural gas. Moreover, the prolonged period of high oil prices and high natural gas prices as LNG in major global markets has further prompted investors to seriously consider various gas based projects. The cost competitiveness of potential gas based developments is highly dependent on the cost of methane. Gas pricing has been and continues to be favorable in the GCC countries, thus allowing production of methane based products to be highly competitive on cash cost basis.



### 7.1.6.1 Recommendations

The impact of oil price movements on the competitiveness of GCC petrochemical production is significant and feedstock prices offered to both current and future projects should continue to remain the key cost factor. As oil prices increase, the profitability of pure ethylene derivatives facilities should generally become higher in the GCC countries, which has been estimated in Chapter-6. Therefore, such investments should be considerably more favored in GCC countries as compared to Asian countries, if high oil prices are sustained.

### 7.1.6.2 Petrochemical Infrastructure & Logistics

The major petrochemical sites in the GCC countries are Al-Jubail and Yanbu in Saudi Arabia, Mesaieed in Qatar, Shuaiba in Kuwait and Ruwais in Abu Dhabi. Except for Shuaiba and Ruwais, which were developed in 1997 and 2002 respectively, all these sites are fully utilized, both in terms of land as well as provision of utilities.

In order to promote further industrialization, the GCC Governments are developing more grassroots industrial parks for example, Jubail Park in Saudi Arabia and Ras Laffan in Qatar, that provide roads, ports, industrial water, utilities and other infrastructure. The initial provision of land and utilities was aimed at providing incentives to invest at these locations. However, now it is incremental investment based on demand from the industry.

The petrochemical industry in GCC has and will continue to be export driven. The current ports in all most all the countries involved in petrochemical production may not suffice for additional supply. Plans to alleviate this problem are being developed. However, they will require substantial planning and also investment.

Almost all the countries in GCC region import goods from other countries to meet the growing need of its population. These goods come in containers to their respective ports, once empty the containers are available for loading to export out of these countries. This is called backhauling which is very critical in logistics management. The rates for utilizing these containers are substantially low when compared to containers brought in especially for loading, which have to be moved empty to the loading port. Therefore, the most commercial ports usually provide sufficient backhauling opportunities. The exports of liquids are different, as it requires loading arms and appropriate storage at the port to affect these exports.

Currently, In Saudi Arabia there are two industrial ports at Al-Jubail and Yanbu, while there are three commercial ports at Dammam, Al-Jubail and Jeddah. The liquid export facilities at the industrial ports are fully utilized and handling of additional liquid will require expansion of these facilities. On the other hand, the solid handling at these ports has shown extremely low utilization, and caters only for bulk exports like fertilizers etc. Almost 40% of the palletized exports are performed from the ports of Dammam and Jeddah primarily to avail the saving through backhaul. This requires additional trucking from Al-Jubail to Dammam or even sometime to Jeddah and from Yanbu to Jeddah.

Similarly, it is understood that small ships carry products from Al-Jubail to Jebel Ali in UAE to re-export to the major destination in Asia. In Qatar, the chemical jetty at Mesaied is used to export the petrochemical products out of the country. In UAE the busiest port is Jebel Ali, which cater the most of GCC export including shipments from Iran also.

### **7.1.6.3 Recommendations**

- The large scale industrial parks and economic zones require massive investments. The recommendation here is that GCC countries should

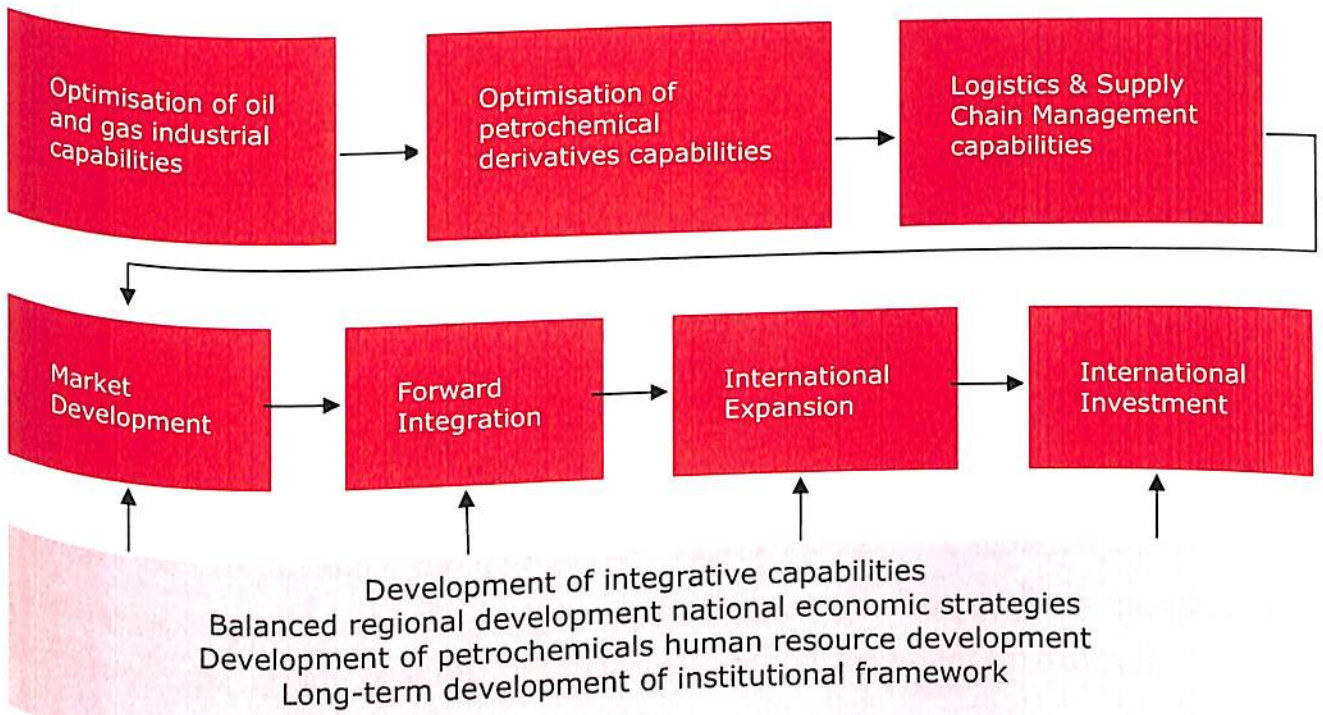
use a mix of project finance, private sector equity and some supports from the government.

- The logistics are expected to play a more critical role in the future as exports from the region grow almost four fold in this decade. Proper planning will have to be undertaken in order to ensure that there is sufficient storage, warehousing and port facilities available to handle these exports.
- Efforts to develop the under-utilized ports should also be taken such that commercial shipping lines can call at these ports, thereby providing opportunities for backhauls.
- There is a need for increased participation of private sector in logistics management. Although, the GCC governments have realized this need and government now intend to involve the private sector not only in oil and gas sector but more so in the utilities service sectors, for example, the formation of AES Ras Laffan Power Company in Qatar and Marafiq in Saudi Arabia. As the participation of private sector increase the future prices for these services will gradually increase to limit the pressure on State monetary resources and also provide an appropriate return to the private sector investors.

## 7.2 STRATEGIES FOR GCC PETROCHEMICAL INVESTMENT

The GCC petrochemicals industry is going through a period of unprecedented expansion. With its substantial feedstock cost advantage, global chemical producers and technology providers alike are investing billions of dollars in regional petrochemicals projects as they seek to create new, more cost-effective hub for production. Some 13 million tons of new ethylene capacity is forecast to come on stream in GCC countries over the next five years, more than doubling total installed capacity in the region. Till June 2006, more than \$20 billion worth of contracts have been awarded to build new capacity in the six GCC states. (see Table 4.6, Chapter-4). In this last section of the thesis, appropriate strategies for GCC petrochemical investment are discussed. These strategies will take into account the entire value chain and discuss the appropriate actions at each point in an integrated manner.

**Figure 7.2: The diagrammatic representation of strategy elements for strategic investment decisions in GCC countries**



## 7.2.1 Strategy Elements for Strategic Investment Decisions in GCC Countries

### 7.2.1.1 Optimisation of oil and gas industrial capabilities

As mentioned in Chapter-4, the GCC countries account for 40% of the world crude oil reserves and 29% of the world gas reserves. Oil and gas reserves shape the future developments in petrochemicals across the GCC region. As Qatar and Saudi Arabia both focus on significant oil and gas development over next decade which is expected to increase the availability of ethane, and LPG or naphtha for petrochemicals use. Most of the gas reserves are non-associated gas and bulk of these fields have yet to be developed. According to Arab Petroleum Investment Corporation's (APICORP's) estimates, \$ 50 billion is expected to be invested in oil chain and \$58 billion in gas chain (including gas based petrochemicals) during 2006-2010 in GCC states. Among the countries, the larger cluster of big investors is Saudi Arabia (\$50 billion), Qatar (\$ 30 billion) and UAE (\$ 15 billion).

The strategy focus in all GCC states is optimisation of oil and gas production. Saudi Arabia's oil output stood currently at 9.5 million barrel per day, with production capacity of 11 million barrel per day. Saudi Arabia benefited both from high oil price as well as from its ability to increase production and export. With spare capacity Saudi Arabia will be ready to replace any lost production from Venezuela, Iraq and Nigeria and will reap higher revenue, which in turn will help to finance the mega petrochemical and energy projects in the country.

UAE is the second largest oil producers among the GCC countries. Crude oil production in country is 2.7 million barrel per day. UAE is targeting to increase oil production around 4 million barrel per day by 2007. UAE gas reserves are estimated at 212 trillion cubic feet per day. The increased domestic consumption of electricity and growing demand from petrochemical

industry has led to a dramatic increase in consumption of gas. The optimisation strategy of gas production will help UAE to replace oil with natural gas as energy supply for vehicles. Similarly, it can aim at increasing LPG exports to become one of the top three exporters in the next five years. So far the growth of petrochemical industry in UAE has been somehow slow. The optimisation of gas production will definitely support the petrochemical industry growth in the country.

Kuwait has been identified as a medium priority market for the oil and gas sector. Kuwait needs to develop the gas sector, increase the country's refinery capacity and enhance the petrochemical sector with higher value exports. Available reserves of oil and gas in Kuwait ensure the long term business opportunity. Kuwait's future strategy should focus on optimization of oil and gas production. At the same time, boosting the petrochemical industry will be strategic tool for diversifying into Kuwait's non-oil exports. It will not only, boost the exports but it will also hedge against any dip in oil prices in future.

Qatar is largest natural gas producer among GCC countries. There are number of factors that have contributed to making Qatar a success story in the world of natural gas in such a short period of time. Qatar's North Gas Field is the largest non-associated gas field in the world, with proven reserves estimated at over 900 trillion cubic feet (equivalent to about 162 billion barrels of oil) which is over 15% of the world total. These reserves will be sufficient to support planned production of natural gas for over 200 years.

Qatar is moving ahead with its mega projects to meet the fast growing global consumption and become the world's number one in LNG production. Besides, optimisation of natural gas production, Qatar's long term strategy should also target the major integrated upstream and down stream GTL projects to expand its petrochemicals capacity in future.

The hydrocarbon sector is the mainstay of the Oman economy. Oman's major challenge at present is drop in production volume of crude oil. To reverse this decline in oil production, Petroleum Development Oman (PDO) has planned for major investment in technology and infrastructure in coming years which will boost the Oman's oil exports. Although, oil remains the single most important source of revenue, Oman has made natural gas the cornerstone of its diversification and economic growth strategy. At present, gas is largely utilized for re-injection into oil reserves to sustain oil production. Oman future strategy should include the utilization of gas for gas based industrial projects like fertilizers, cement and petrochemicals.

Bahrain's dependency on oil is the least compared to other GCC countries. It is quite evident that the country has started rigorous diversification efforts for reduce the dependence on oil. The refined oil production of Bahrain has increased gradually over past few years. The strategic option for Bahrain remain improving bi-lateral relationship with its neighbouring oil rich countries and expand its the oil and gas application industry in the country beside following the path of non-oil industrial growth like service and financial sector.

### **7.2.1.2 Optimisation of petrochemical derivatives capabilities**

The history of industrial development in the GCC countries in recent decades has been one of constant movement towards economic diversification and value addition. Key drivers for this natural evolution have been the desire to diversify away from crude oil and to create more employment opportunities. Saudi Arabia and rest of the GCC states have a natural cost advantage for petrochemical feedstock. Ethane is currently priced at \$ 0.75 per million BTU for industries in Saudi Arabia; in other GCC countries it is priced in the range of \$1 to 2 per million BTU. GCC producers can sell products like polyethylene competitively in any market due to their low cost structure.

The high price of crude oil is bringing the extra revenues into GCC governments and private entity hands, thereby stimulating a desire to invest in various development projects. There is an abundant amount of private capital seeking investment opportunities in the petrochemical and downstream related sectors. In addition, GCC countries are seeking to attract investors for downstream converter businesses. Although it is easier to simply export plastic pellets, the GCC states are expected to produce more converted products because of the massive polyethylene and propylene surpluses in the region. Confronted with this challenging and changing environment, the GCC countries should adopt a multi-dimensional approach, which will include plastic conversion. If they are successful, by 2015, GCC producers will not only compete for market share in primary ethylene derivative markets but downstream markets for non-durable goods as well.

The plastic converting industry is still in its infancy in the GCC. Although there are a large number of converters, they are comparatively small in size and mostly serve the local markets. The global converter industry landscape is changing, with new focus areas in Asia and the Middle East. The time is right now for the GCC converting industry to grow, but investors need to select products judiciously for export markets. A very efficient global supply chains can be developed based on: (a) low-cost feedstock in the GCC countries and (b) low wages and modern factories in China.

These supply chains will feed the major consumer markets of North America, West Europe and others. It is possible to bypass the middleman and go directly from GCC to end markets. China is a great example of the potential that the GCC can follow. Starting from a low volume, exports of finished plastic goods have increased from less than 2 million metric tons in 1995 to almost 9 million metric tons in 2006. These goods include plastic carrier bags, boxes, building materials and bathroom accessories.



Global conversion industry is moving towards more and more globalization. Converted products sourcing from low cost regions by major consuming regions like North America and West Europe are on the steady rise. Finally, the export oriented conversion is possible in GCC region due to: desire to diversify, low labor and utilities cost, availability of soft loans, availability of resin and possibly lower prices resin and low tax rates.

### **7.2.1.3 Logistics & Supply Chain Management Capabilities**

Supply chain management in the petroleum and petrochemical industry contains various challenges, specifically in the logistics area, that are not present in most other industries. These logistical challenges are a major influence on the cost of oil and its derivatives. Werner Paratorius, president of BASF's petrochemicals division said "Supply chain management is the backbone of a business where logistics costs can be greater than manufacturing costs" (Whitfield, 2004, p.R12).

As mentioned in section 7.1.7 earlier in this chapter, the petrochemical industry in GCC has and will continue to be export driven. The logistics support in all most all the countries involved in petrochemical production may not be sufficient for additional supply. The infrastructure and logistics issue becomes more complex when liquids come into play. Delivery costs can account for more than 30% of total delivered costs to major export markets. With growing additional supply, more liquid storage facilities are required. Containers availability and movement are the concern in the region. There is a need to plan for increased cooperation among the GCC member nations for a wider road and rail network that would give easier container access. In GCC countries, the logistics and supply chain management challenges can be tackled at two levels: country level and corporate level.

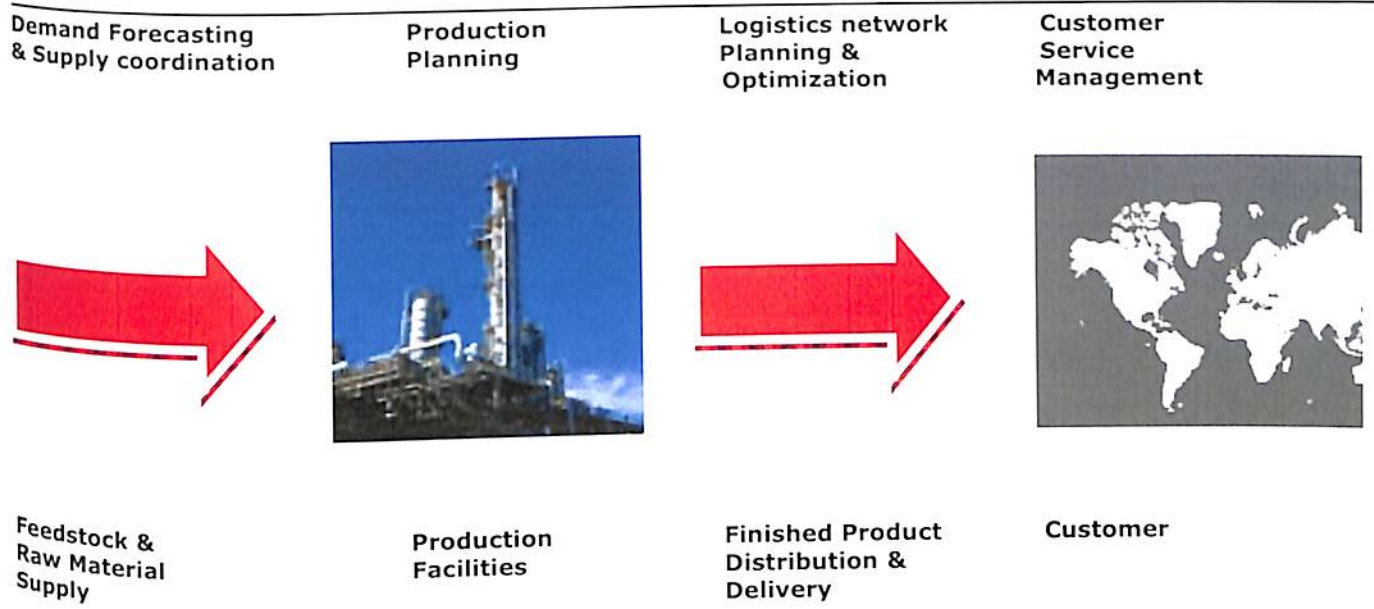
At *country level*, for development of logistic services in GCC countries, governments need to invest in large network of railway and road network, expansion of ports and terminals, which include creation of large tank storage and distribution terminals for oil and chemical products, along with specialized warehousing, pipelines interconnecting oil and chemical companies. The best example of port and terminal management of handling petroleum and petrochemical products is the Port of Rotterdam. Rotterdam is Europe's largest port in terms of throughput volume and products can be transported into Europe via pipelines, freight barge, rail and tank truck, or by coaster or ocean-going vessels to overseas locations.

Although, there are some world class port facilities are available in the region, for example, Dubai Port Authority is considered to be the third largest port in the world. Similarly, Ras Laffan Port in Qatar is the world's largest LNG port within this area. Considering the expansion of export oriented industry, the available facilities will not be sufficient. Therefore, at government level, efforts to develop the under-utilized ports should also be taken such that commercial shipping lines can call at these ports, thereby providing opportunities for backhauls. There is a need for increased participation of private sector in logistics management.

At *corporate level*, for development of supply chain management in GCC countries, the petrochemical companies have to take major step. In simple language, supply chain is managing the flow of raw materials, products, information, and associated financial resource between the company and its suppliers, service providers and customers in most efficient way.

The scope of supply chain management for a petrochemical company should cover entire supply chain from feedstock until product is delivered to the customer, as show in figure 7.3.

**Figure 7.3 A typical Supply Chain Management for Petrochemical Company**



Source: *Strategic Supply Chain Management Leadership*, William B. Lee, 2006

The focus areas for any supply chain management programme are: customer service management, sales and operation planning, supply chain logistics network design, organizational alignment and IT enablement. The major petrochemical companies in GCC region like SABIC, EQUATE, QAPCO, ADNOC are having the supply chain management system in place. Considering their future expansion and growth it is equally important for these companies to invest further to strengthen their supply chain management and even look for the collaborative SCM arrangement as an alternative.

Despite the great challenges in the petrochemical industry's supply chain, opportunities for improvements and cost savings do exist along the supply chain. One major area for improvement and cost savings lies in the logistics function. Companies in the petroleum industry have become increasingly reliant on the services of third-party logistics companies to manage their supply chains. Some companies took the outsourcing idea a step further to collaborate with competitors and found shared solutions to their supply chain challenges.

#### 7.2.1.4 Market development

The Chinese and Indian markets are the main engines of the current global economic recovery for the more developed producers. China dominates in manufacturing and has the market size and spending power domestically. India is strong in technology/IT services. Both economies currently enjoy strong external positions with ample foreign exchange reserves.

The global petrochemicals industry is at a crossroad, largely because China is becoming an increasingly important consumer and supplier of petrochemical products. The reasons are strong demand within the country and cost advantages over Western industrial countries both in the production of petrochemical products and for key customer industries building up production capacities. In China, petrochemicals consumption has increased by about 12% per annum over the past ten years, while the European Union and the USA have posted figures of only 4%.

The industrial countries are shifting petrochemicals activities to China, following their main clients – the automobile, electrical & electronics, communications and textiles industries – that were attracted by the Chinese sales prospects and cost advantages. To remain competitive, direct contact between Western petrochemicals producers and customer companies in China is often of pivotal importance.

In the changing market scenario, GCC suppliers need to partner with key customers to develop innovative solutions that will allow them to differentiate in a highly competitive market environment. The combined efforts of GCC manufacturers and their customers will create the opportunity for the new applications and business. This scenario will be based on the key drivers like

feedstock location, customer structure, customer requirements, business process innovation, economical/technical substitution, environmental substitution and logistic issues.

The ideal supplier of petrochemicals in the selected industry scenario should manage a portfolio of 80% standard grades and 20% premium grades and serves high volume customers as well as smaller accounts in every region of the world with a market share of at least 10%. Currently, GCC manufacturers like SABIC fulfils the portfolio criteria of the ideal product supplier in Europe but the market shares are well below in all other regions.

Marketing and sales approach of GCC producers will generally tailor to the specific requirements of the different regions to secure the growth plans for petrochemical products. In Europe and North America the focus will be on strengthening the technical service and timely delivery whereas efforts to improve the supply chain management will be the key for the Asian market especially China due to vast size of the country and number of customers, a complex distribution has evolved with many layers and some unique selling methods. While some producers and importers (trading companies) sell a portion of the imports directly to the customers, most use local agents and distributors. They in turn may sell directly to the customers or use another set of distributors, particularly once out of the major consuming centres of the coastal provinces and major inland cities.

Another crucial strategy for GCC petrochemical producers will be developing an effective global sales force with a global key account management skill and technical service specialists to offer customized services. Market intelligence and competitor surveillance capabilities need to be improved over time through selected training efforts.

## Forward integration

The best examples of vertically integrated companies are in the oil industry. Most of multinational oil companies (such as ExxonMobil, Royal Dutch Shell, BP) have adopted a vertically integrated structure. This means that they are active all the way along the value chain from locating crude oil deposits, drilling and extracting crude, transporting it around the world, refining it into petroleum products to distributing the fuel to company-owned retail stations, where it is sold to consumers.

Similarly in each GCC economy, we find at least one major vertically integrated oil company, as illustrated in detail in Chapter-5. For example, in Saudi Arabia, *Saudi Aramco*, is a fully integrated global petroleum enterprise, with exploration and production, refining, distribution, shipping and marketing network. In Kuwait, *Kuwait Petroleum Corporation* (KPC) manages eight major subsidiaries which covers domestic and overseas exploration and development, oil refining and marketing, oil transportation and petrochemicals. In Qatar, *Qatar Petroleum(QP)* responsible for all phases of the oil and gas industry. The activities cover exploration, drilling and production operations, transport, storage, marketing and sale of crude oil, natural gas liquids, liquefied natural gas, refined products, petrochemicals and fertilizers. In UAE, Abu Dhabi National Oil Company (ADNOC) is responsible of all petroleum, gas and petrochemical industries and carries out development, production, sales activities through its subsidiaries.

With the availability of huge reserves of oil and gas at relatively low cost to produce, compared with other countries, GCC countries, with the exception of Saudi Arabia, have failed to establish forward integration in petrochemical industries which use oil and gas as raw materials. Through SABIC, Saudi Arabia has presented an excellent example of how an oil producing country

can maximize the use of its indigenous natural resources. Petrochemical products can be used to provide raw materials to many industries, which can be established in GCC countries.

Similarly GCC countries have also failed to expand its refinery industries. Most GCC countries build refineries to satisfy domestic demand and completely neglect the establishment of refineries to expand the exports of petroleum products. In their efforts to add value to the products that they produce, GCC countries should reduce the exports of crude oil and instead gradually increase the production and exports of petroleum products and must profit from every stage of the oil and gas value chain.

Forward integration is one of the methods to be used by the GCC states to maximize their return. By implementing the forward integration, the major GCC countries will not only bring significant benefits to the oil producers but it will also increase their influence in the international oil market.

#### **7.2.1.5 International expansion**

For the middle eastern petrochemical industry the major question today is "can the historic feedstock advantage be maintained?" Although, the gas processing activity is increasing in Saudi Arabia and Iran, but ethane availability will remain tight. Two important signs of petrochemical industry are pretty clear now, one the volatility in oil price will remain and second, industry is heading towards a down cycle that will result in reduced profitability on the industry wide basis. Therefore, the most successful companies will be those that achieve competitive advantage in number of ways-more than a simple feedstock play.

These development is putting the pressure on GCC petrochemical producers to diversify product and market slates beyond polyolefin. The profit earned

so far due to high oil price need to be spent for the international expansion of the industrial activity beyond the geographical limits of GCC region. SABIC's international expansion and diversification is the best example for the rest of GCC petrochemical players.

SABIC has 25 international subsidiaries and 28 distribution and storage facilities in different regions of the world. SABIC's current strategy is to expand capacity, and diversify globally into different markets through acquisitions and joint ventures in all areas of petrochemicals. Realizing that Chinese market is one of the main engines of the current global economic recovery, SABIC is investing in petrochemical complexes in China as part of its strategy to strengthen its response to the Asian market. Besides that SABIC is also looking at grassroots investments in India, where SABIC is willing to consider building a cracker as a joint venture project with a local partner.

Therefore, GCC petrochemical players have to realise the importance of international expansion and should consider to extent their industrial activities to other countries, especially, in China and India as a part of their strategic international expansion to capture maximum benefit from the growing consumer base in Asian countries. Recently, Russia has also shown much interest in the GCC economies and there is hope of opening new doors for GCC enterprenure in this untaped market.

#### **7.2.1.6 International investments**

As mention in section 6.4 of Chapter-6, a number of GCC petrochemical participants are already considering investment in other regions. SABIC is among the front runners. its recent acquisition of North America based plastic makers GE Plastic (May 2007) is the largest acquisition by any middle eastern company abroad. Among the GCC oil companies, Saudi Aramco has



large number of joint venture projects in different part of the world. The main drivers for Saudi Aramco to acquire share in the overseas refining companies is to have assured outlets for its crude oil.

In recent years, the bilateral relationship between Saudi Arabia and China has improved which resulted into a long term business partnership as number of joint venture projects has been kicked off in both the countries, major participants of these projects are: China Chemical & Petroleum Corp (SINOPEC), Saudi Aramco and SABIC. It expected that other private business groups from both the countries will try to bring more investment projects at the downstream level or the midstream level in future.

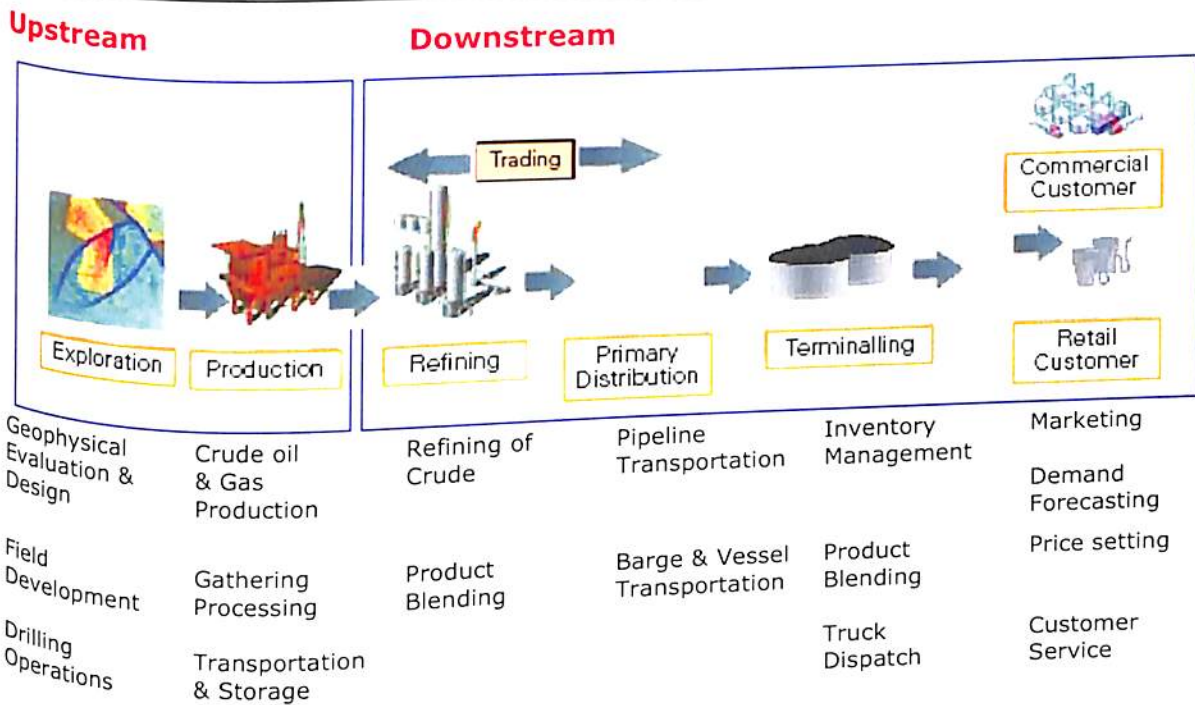
As a matter of fact, so far major investment from Middle East has directed towards the Western Europe and North America but in current geo-political and economic situation most of the Arab investors have started looking towards Asia to invest windfall oil revenue, eager to ride its rise and diversify away from the US. Among other GCC countries UAE and Qatar are also progressing well in their investment projects in Asian countries like China, India and Malaysia.

From strategic investment point of view GCC countries should look closely to the BRIC (propagated by Goldman Sachs) economies. BRIC stands for Brazil, Russia, India and China. BRIC economies are expected to dominate by 2050 with 40% of global population and \$15 trillion combined GDP. In petrochemical terms, India and China are suppliers of manufactured goods and Brazil and Russia are suppliers of raw material. GCC –the oil and gas rich region can add more excitement to this combination. The business partnership between GCC economies and BRIC economies will add more meaning to the polyolefin industry by shifting demand pattern away from "old economies" and most likely, China and India to overtake the US automobile industry.

### 7.2.1.7 Management of value chain relationship

The value chain framework is a method of breaking down chain from basic raw materials to end use customers- into strategically relevant activities (*Shank, J & Spiegel, 2005*). It tells how businesses receive raw materials as input, add value to the raw materials through various processes, and sell finished products to customers. Each industry has its own value chain, likewise, the oil and gas industry and petrochemical industry. In following figures these value chains have been clearly explained:

**Figure 7.4 A typical Oil & Gas Value Chain**



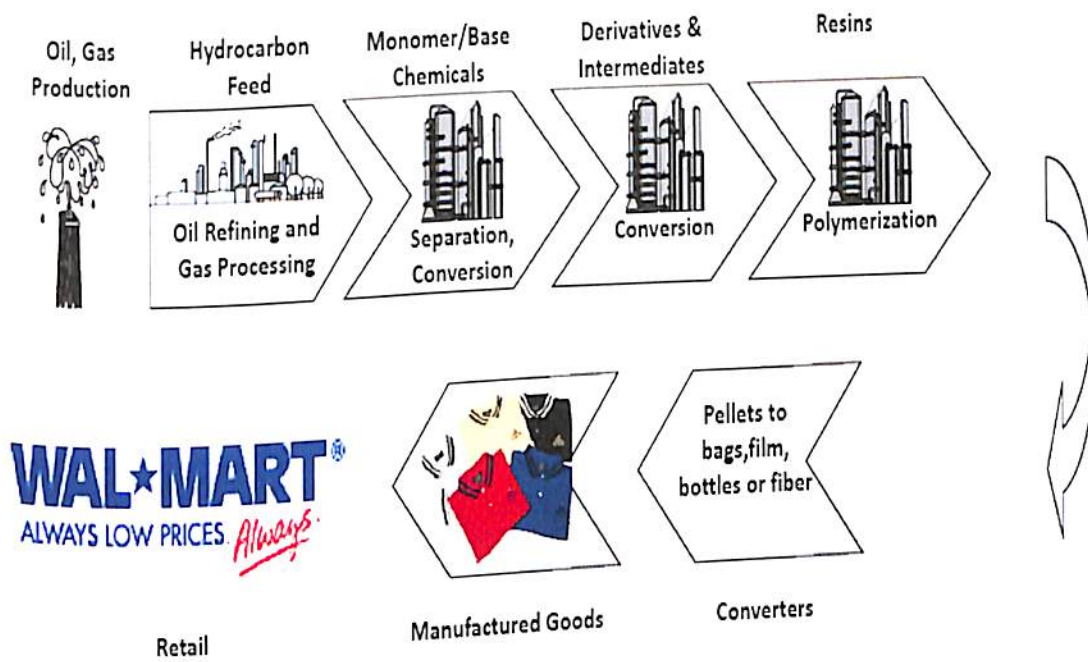
Source: Strategic Asset Management in Oil & Gas Industry ([www.mro.com](http://www.mro.com))

The oil and gas value chain is complex but systematic. Every stage of chain demands specific commercial activities to add value in the product before it reaches finally to customers. A typical upstream company (Kuwait Oil Company) only manages exploration and production activities whereas a downstream company (Kuwait National Petroleum Co) concentrates to

refining and marketing. An integrated oil company ( Saudi Aramco) manages the both.

Similarly, petrochemical value chain is a series of intermediates that produces an end use product, as illustrated at Figure 7.5. Each step provides opportunity to buy, sell, exchange or swap intermediates to optimize costs and assets utilization.

**Figure 7.5 A typical Petrochemical Value Chain**



Source: Developed from different sources of industrial publication

Petrochemical companies make strategic decisions based on capital, technology, competency and market access. They use integration to feedstock as a means to capture value where as international integrated energy companies use petrochemical business to add value to hydrocarbon resources and to strengthen their global position.

All these strategies need a sound management of value chain relationship through building capabilities including IT infrastructure, marketing and management of diverse workforce. GCC petrochemical companies and integrated oil and gas companies need to work hard on these aspects in order to manage their expanding value chain relationship.

#### **7.2.1.8 Development of integrative capability**

Management of value chain relationship calls for development of integrative capability where GCC countries need to get involved in the forward integrated industries. As we have seen that pattern of development of oil and gas industry in GCC countries are not the same, mainly because of variation in hydrocarbon resource availability. For example, *Saudi Arabia* has largest oil reserves, and country is largest exporter of crude oil. The refinery capability of the country is just enough to meet the current domestic demand but country has been successful in exploiting the available hydrocarbon feedstock to develop a very strong petrochemical industry in the region. In an effort to expand its hydrocarbon industry further, it needs the forward integration of petrochemical industry to plastic conversion industry. In this effort, Rabigh Conversion Industrial Park is currently inviting plastics converters to set up the units at the industrial park and offering low energy and input costs, as well as government incentives. In another effort of forward integration, Saudi Aramco's initiative of expanding its refining capabilities and investing in integrated downstream facilities (refinery and petrochemicals) are highly appreciated. These initiatives will not only create private investment opportunity in the country but also huge employment opportunity for local youth.

Similarly, *Qatar* is the largest producer of natural gas in the region and been able to utilize this hydrocarbon resource for country's economic development. So far Qatar's focus was development of LNG, GTL, pipeline gas export and

to feed gas to local industries and power plants. The petrochemical industry has its old presence but it has not been able to expand much. With its current diversification strategy within the hydrocarbon sector, Qatar Petroleum is intended to build a stronger petrochemical industry which is natural forward integration.

UAE has a balance reserve of oil and gas which has been exploited time to time for strengthening the economy of the country. Somehow, petrochemical industry has not got much attention in the past. But current initiative of ADNOC is definitely in order to create forward integration of oil industry into petrochemical industry, similarly, ADBIC intend to develop the plastics conversion industry and have set a goal of 1 MMT of processed plastics products in Abu Dhabi by 2015.

Kuwait's hydrocarbon wealth is limited to crude oil and associated gas. Kuwait has had to rely on burning valuable associated gas for fuel purposes. The recent plan to import gas from Qatar is clearly aimed towards making Kuwait more self-sufficient in gas for power and desalination projects. PIC and Equate has number of projects for expansion of petrochemical industry in the country. These projects will target to increase its ethylene capacity from 850 KMT (2005) 1650 KMT (2010), which will substantially increase its polyolefin capabilities. The downstream projects will help the country to achieve the forward integration which is at initial stage of development.

We may conclude here that GCC countries, who have developed petrochemical base, are seeking to attract investors for downstream conversion businesses. Although it is easier to simply export plastic pellets, but GCC states are expected to produce more converted products because of the massive polyethylene and propylene surpluses in the region.

The countries who are not having strong petrochemical base are seeking more investment in their ethylene and olefin projects in order to achieve forward integration of their oil and gas industry to petrochemical sector.

#### **7.2.1.9 Diversification of national economic strategies**

*Global Insight* in its latest economic report (June 2007) has noted “a combination of strong oil revenues, U.S. military protection, political stability, and sound economic policy has resulted in noticeable economic development in Gulf Cooperation Council (GCC) countries.”

The GCC countries not only have similar economic and political structures, but they have also established substantial links with each other. Initially established as a security arrangement among the six member nations in 1980, now the GCC moved beyond security cooperation and shifted its focus onto economic integration and regional policy coordination. The most important common economic characteristic of GCC countries is their heavy reliance on oil and gas exports. Oil and gas account for at least 80% of export revenues in all GCC countries and they have all benefited from the strength of oil prices in recent years. This reliance, though, has made their economies vulnerable to fluctuations in the price of oil.

To cope with this vulnerability, GCC countries are trying to diversify their economies and are also accumulating large supplies of foreign assets. GCC countries need to make further progress in their economic and industrial modernization drives. In addition to abundant resources, they enjoy two additional positive factors. First, the member governments appear committed to sound economic reforms that will lead to long-term investments and economic growth. Second, they will continue to benefit from their political and security tie with USA and United Kingdom. The combined effect of these

three factors offers a positive economic outlook for GCC countries, but the diversification of national economic strategies to move from being merely oil- and gas-dependent economies to a wider base of industrial development needs to be carried on with full force.

#### **7.2.1.10 Balanced regional development within individual GCC countries**

Addition to the similarities mentioned in earlier section, there are some more similarities in the political institutions of GCC nations. All six can best be described as traditional monarchies, or sheikhdoms, with very limited democratic institutions. The extended ruling families dominate the key political and economic positions, moreover, these states are ruled by specific tribes or sects in each country. The regional developments in the country are influenced by ruling families. This kind of political institution always leads to uneven development within the country. The income and development gap among regions within the country are significant and is expected to widen in GCC nations.

Beside, political aspect there is economic aspects of the uneven regional development. The economy of these nations is heavily dependent on the development oil and gas industry and petrochemical industry, the spread of these industries are limited to particular region rather than whole country.

The benefits of oil and gas industries and petrochemicals industries need to be spread out for balanced regional development within each of the GCC countries in the interest of political stability. Some countries have started working in this direction. For example, Saudi Arabia intends building six new cities in the different regions of the country. These cities will promote economic development in the regions that until now largely been ignored and help decentralisation and lead to balance regional development in the

country. Investment in these economic centres are expected to be more than \$200 billion, The industries emphasised in these economic cities are of agribusiness, mining, manufacturing, energy and academic and research institutions.

Similar initiatives have been noted in Qatar, The State of Qatar has established two world class industrial cities :Ras Laffan Industrial City and Mesaieed Industrial City where its major industrial projects are located covering, oil and gas, petrochemical, steel reinforcing bars, cement, commercial ship repair etc. Although, these two industrial cities are old but its future expansion and development plan is also well placed with expectation of adding more new projects to the existing industries like refinery, crackers and derivatives projects as well as attracting new industries like aluminium. UAE is also focusing on the promotion of economic development in different regions that until now largely been ignored and expected to lead to balance regional development in the country. The key feature of UAE's economic development is that it has been largely supported by foreign investment in Emirates as compare to other GCC nations.

Other countries in GCC region are somehow been slow in spreading the benefits of oil and gas industries and petrochemicals industries for their balanced regional development. It is highly recommended that these GCC nations should learn from the experiences of their neighbouring nation to promote the balanced regional development within the countries which will not only lead to economic stability but the political stability of these nations.

Further, these balanced regional development will help these six GCC nations in achieving the greater economic integration of GCC economies which is due from its formation in 1981. There is no doubt that the future growth of GCC nations lie in the regional competitiveness and economic integration.



### 7.2.1.11 Development of petrochemicals human resource management

Development of petrochemical human resource management is extremely important as the thrust of value integration lies in the quality of human resources. It is, otherwise, also noted that today human capital is the key differential for companies with similar access to technology and financial resources.

Human resources in the GCC countries are a major constraint on managing the current and future petrochemicals development. Companies, like SABIC, have admitted that it will have to face the consequences of demand for some 20,000 skilled workers to help build and operate 14 million tonnes of new petrochemicals production in Saudi Arabia alone.

Further, in an attempt to diversify away the economy from oil, the GCC countries face a major problem in that, their existing skill base for workers is low by world standards. Relatively little research and development, and innovation are also issues of concern. Data from the *Global Competitiveness Index* (World Economic Forum, 2007) indicate that the region significantly lags behind in terms of education and innovation.

World Economic Forum has noted that enrolment rates in educational institutions remain low on average, particularly at the tertiary level, and the quality of education is in need of upgrading. In order to realize their full competitive potential and to achieve self sufficiency in skilled human resources, GCC countries should focus on strengthening the availability and quality of educational institutions at all the levels, although the performance on educational indicators among GCC countries is very diverse. Some countries lag behind in terms of primary education and display fairly high levels of illiteracy, while other countries need to improve university

education. A common problem that occurs across the region, however, is that the educational institutions do not teach young people the skills necessary to succeed in the private sector.

The challenge of development of human resource management in GCC countries can be tackled at the *policy level* by the government and at *corporate level* by the companies, for relevance of our study of petrochemicals companies.

At the *policy level*, if we look closely on the labour market reforms in GCC countries as mentioned in section 1.5 of Chapter-1, we may notice the dependence on cheap foreign labor has delayed the formation of a skilled national workforce and prevented the development of a diversified and productive private sector that could help absorb new entrants into the workforce. Now it is high time for the policy-makers to act strongly. The first step in reforming labour market in GCC countries is to tighten immigration policies in order to wean employers from this dependence on foreign workers. Another step would be to increase the cost of foreign labour and encourage private companies to invest in labour saving technologies and to create higher value added jobs. In addition, international pressure for fundamental reform is growing, as GCC states integrate themselves further into global economy, the external pressure will build to bring their labour markets up to global standard. Therefore, direction for change is clear.

At *corporate level*, petroleum and petrochemical companies like SABIC, Saudi Aramco and Qatar Petroleum have successfully developed their strategic roadmap for human resource development which include increasing the proportion of nationals in their workforce, help senior management staff in joining the continuous learning program aimed to develop the higher education and specializations required by the company, and creating a business culture that stresses and encourages creativity, innovation, learning

and personal development but this is not sufficient as the 'ready' pool of potential employees in GCC countries has been substantially depleted in recent years.

Considering the future requirements of these companies, their work with the Higher Council of Manpower in their respective countries should be extended to include active participation in programs directing young students toward technical schooling as well as direct participation with colleges and universities in building curricula and channeling graduates into their training programs and employment. Some efforts have been made by companies like SABIC and Saudi Aramco who select hundreds of scholarship students for study abroad to get specialized training in emerging management and technical areas and also learn the language and culture. In addition to that a proactive comprehensive University relationship program both within the country and among GCC countries should be undertaken and program elements should include: joint degree program planning focus on needs, seminar and project sponsorship for professional development to upgrade corporate and university staff, summer hire program to introduce top quality candidates to industrial environment, development of worldwide network of industry professional contacts and inventory of skills through alumni of the universities.

As the human resource development program has been identified as a major challenge for the GCC diversification and expansion of petroleum and petrochemical industry in this study, GCC petrochemical players may take up joint responsibility of developing world class petroleum and petrochemicals institutions on the pattern of Institut Français du Pétrole (Institute of Petroleum) in France or University of Petroleum & Energy Studies in India, which will act as research centre for solving their technical and management problems, training centre for skill enhancement and advance degree and training program for their existing staff and will provide a pool of talent at

graduate and research level for their future recruitment. These comprehensive strategies will definitely go a long way in solving the skilled manpower problem in GCC industry.

#### 7.2.1.12 development of institutional framework

Continual development of an institutional framework to support integrative and balanced growth of petroleum and petrochemicals and related industries are required. The GCC countries have benefited enormously from oil and gas reserves and assets that have generated significant financial liquidity in the last six years. They face the challenge that their collective oil reserves, although vast, will not last forever. Nor are oil and gas always a reliable source of wealth—there have been many times when GCC budgets were in deficit and public debt rose as a result of falling energy prices.

One must appreciate that on average, these countries so far displayed well-run institutions with relatively well protected property rights and fairly low levels of corruption. Businesses have trust in the honesty of politicians and consider public spending to be well invested. Efforts to strengthen the financial sector have started paid off in the region but at the same time,

financial markets are not sufficiently geared toward fuelling entrepreneurship, and access to finance for local small companies remains difficult in many countries, despite high liquidity levels.

In fact, the GCC countries need to develop strong identities and work together to coordinate diplomatic and economic policies through technocratic governance and a strong internal market. Over regulation slows the process of globalization, the GCC countries have to make significant gains in terms of competitiveness, which should be done via a series of top-down reforms and industry policy and by focusing on market liberalization.

They require to improve health, education, and technology sectors substantially, the institutions and markets have to be geared toward strategic priorities and infrastructure investments, occasionally which suffer from poor planning. Nevertheless, efforts to build the private sector and to improve the efficiency of the public sector will pay off in terms of increased business sophistication and reduced costs of bureaucracy and corruption.

In long term, GCC nations should progressively develop a coordinated regional economic strategy that aims at (a) encouraging public-private partnerships, (b) encouraging economic diversification, and (c) improving governance through stronger and more efficient institutions. There should be a focus on building the private sector through targeted incentives for domestic and foreign investment, particularly in tourism, business services, and energy-intensive industries such as petrochemicals, aluminium, and steel.

The skills shortage should be addressed by educational reform aimed at enhancing human capital in strategic sectors, improving public infrastructure across the region, and implementing on-the-job training through appropriate training schemes for local youths in both domestic and international firms.

The diversification strategy should lead to the development of high-tech industries within the oil and gas sector and a public-private partnership to train local engineers.

At the same time, a review of educational standards across the six GCC countries should be undertaken and a plan for regional accreditation of universities should be put in place. Leaders to be encouraged to be role models for private-sector participation. Taken together, all this will contribute to upgrading the image of the professional worker and strengthened meritocracy among the workforce in the region.

Efforts to accelerate economic diversification should continue with strategic research and development (R&D) investments, capturing more of the energy value chain and increasing the world market share of associated industries.

The GCC countries should also work toward possessing some of the leading technologies for oil-field mapping and enhanced oil recovery. The push in R&D is leading to advances in chemicals and starting to spill over to plastics.

There is no doubt that the GCC will be set to become home to a very successful cluster of firms specializing in advanced materials.

Overall, institutional development can be expected to go a long way in creating a solid foundation for the development of GCC countries to attain great heights in fulfilling the aspirations of their citizens.