Organization of Arab Petroleum Exporting Countries
(OAPEC)

37 2010

The Secretary General's 37th Annual Report

ORGANIZATION OF ARAB PETROLEUM EXPORTING COUNTRIES (OAPEC)

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(1) Succeeded H.E. Dr. Chakib Khelil in May 2010

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(1) Appointed as a Minister of Oil in December 2010.


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Mr. Aissa Siouda	Supervisor of the Information and Library Department

Director of the Finance and Administrative Affairs Department*

* The Finance and Administrative Affairs Department is currently under the supervision of the Secretary General

(1) Succeeded Dr. Mukhtar Al-Lababidi in May 2010

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PREFACE

PREFACE

Since the end of 2010 until the publication of this Report, several Arab countries experienced political instability with repercussions for their economic, social and political structures. These developments affected in varying degrees their petroleum industry; from upstream operations to transport and marketing through to downstream. They also impacted other economic sectors associated with the petroleum industry in terms of investment, feedstock, or sourcing energy. It is hoped that in the long run these political developments will have a positive outcome that will enable the Arab petroleum industry to progress toward greater maturity and technological know-how.

The petroleum exporting countries could optimize the benefit from their oil revenues by investing them in all stages of the oil industry, thereby boosting their profitability and promoting their integration with other national industries. Since petroleum will remain for decades to come one of the essential engines of the world economy and a source of prosperity such action will serve both members and non-members of OAPEC. It will help strengthen economic stability on the local, regional and international levels.

In 2010 the international petroleum markets experienced relative stability, particularly in terms of supply, demand and prices, having recovered from the shake-up caused by the global financial crisis of 2008 and 2009. The relative stability in demand and prices brought about relative stability in the revenues of petroleum exporting countries, including Arab exporters. Several OAPEC members resumed investing in the various branches of their petroleum industry and channeled more investments to projects for expanding production capacity. Major Arab national petroleum companies managed to expand abroad particularly in East Asia and Europe by pursuing joint oil and

gas ventures. These include a refinery, a petrochemical plant, laying subsea gas pipelines, and helping to build terminals for receiving and regasifying liquefied gas.

OAPEC members' revenues from crude oil exports in 2010 totaled $451 billion, up $98 billion from their 2009 level of $353 billion, but about $143 billion less than their 2008 record level of about $585 billion. When calculated in 1995 dollars, the revenues in 2010 were no more than $352 billion.

In 2010 the world economy made a modest recovery from the financial crisis, as growth reached 4.7%. This had a positive impact on the relative stability of oil prices, which remained within an acceptable range for both exporters and importers (despite some downward pressure due to the relatively low prices of natural gas). This stability had a knock-on effect for supply/demand and consumption. In OECD countries economic growth resumed, albeit at the low level of 2.8%, in Asian developing countries growth averaged 9.4%, including 10% in China, while in Latin America it reached 5.7%. Consequently world demand for oil rose 1.6 million b/d, or 1.9%, from 84.5 million b/d in 2009 to 86.1 million b/d.

The OAPEC Secretary General's Thirty-Seventh Annual Report has adopted a new format for its content. This highlights in detailed analysis all the issues referred to above. It conveys a clear picture of the various aspects of the petroleum industry and the energy industry in general. It describes the efforts exerted by OPEC and OAPEC to mitigate the effects of the financial crisis on their member countries. OAPEC's General Secretariat convened numerous conferences, seminars and meetings on this subject, in particular the Ninth Arab Energy Conference, which was held in Doha, Qatar, in May 2010. It was attended by ministers of oil and energy from OAPEC member and non-member Arab countries, as well as top officials from international and regional bodies concerned with petroleum and energy. About 500 Arab

and non-Arab energy experts took part. Among the other events organized by the General Secretariat was a conference in Manama, Bahrain, on 'Upgrading Oil Refineries to Produce Clean Fuel, which was held in association with Bahrain's National Oil and Gas Authority in October 2010, and a seminar on 'The Global Financial Crisis and Its Implications for the Oil and Natural Gas Sector in the Arab Countries, which was held in Damascus, Syria, in November 2010. OAPEC also took part in various Arab and international petroleum activities.

The General Secretariat continued to strive to play an active role in all efforts aimed at fostering dialogue and consultation between various bodies and organizations representing petroleum exporting and importing countries, since such efforts benefit both sides.

The Report also highlights efforts of OAPEC member countries to develop their oil and natural gas industries and projects implemented in other energy spheres. These include power generation projects and projects to increase the use of renewable energy, particularly solar, and wind. Such projects underpin efforts to promote sustainable development for the people of the region, through the rational use of oil and natural gas export revenues to upgrade basic structures and socio-economic facilities.

Part One of the Report reviews economic and technical developments in markets and all phases of the petroleum industry.

It provides an analysis, backed by relevant statistics, of all aspects of the production and processing of oil, natural gas, and energy in general. It examines international developments in the industry, including fluctuations in global markets and their impact on OAPEC member countries. These include factors influencing market fundamentals such as supply, demand, and oil stocks, and those that influence market trends, such as geopolitical issues and the energy policies adopted by various political and economic blocs.

Part Two of the Report is devoted to examining OAPEC's activities in 2010, starting with the meetings of its Ministerial Council and Executive Bureau, moving on to the studies conducted by the General Secretariat and the Arab and international seminars, meetings, and conferences that it attended.

The report also contains a review of the achievements of OAPEC-sponsored ventures, as they strove throughout the year to keep abreast of developments in the markets in which they operate and to withstand the aftershocks of the global financial crisis that affected all their activities in one way or another. We are pleased to report that all these ventures managed to strengthen their position, raise their efficiency, and enhance their activities in every segments of their business.

In conclusion, we hope that this Report will provided a full picture of the developments witnessed by the Arab and international petroleum industry in all its branches. We also hope that it will inform of the activities and goals of the Organization of Arab Petroleum Exporting Countries and that readers, regardless of their specializations, will find it an enlightening addition to their knowledge.

Abbas Ali Al-Naqi
Secretary General

PART ONE

International Developments In Oil and Energy

PART ONE

INTERNATIONAL DEVELOPMENTS IN OIL AND ENERGY

CHAPTER ONE

DEVELOPMENTS IN GLOBAL MARKETS AND THEIR IMPACT ON OAPEC MEMBER COUNTRIES

FOREWORD

In 2010, world oil market witnessed a relatively stable prices, compared with the sharp fluctuations in their movement during the last two years. Since the middle of 2009, world economies -as whole- were slowly continuing to rebound back from their worst financial crisis since the Great Depression, resenting a relative recovery in 2010. Many developing countries achieved high economic growth during the year.

Despite the recent economic stimulus programs and the range of exceptional measures and procedures undertaken by many countries of the world, most industrialized and emerging economies were still facing major challenge as a result of dragging in growth rates and high rates of unemployment. The European Sovereign debt crisis, particularly, in Greece in the first quarter and Ireland in the fourth quarter of the year, led to raising the fears about the sustainability of global economic recovery, this in turn has led to a decline in global capital markets and global equities.

In spite of fragility of the global economic recovery, the world oil market regained positive growth of 1.9% in world oil demand in 2010 following a negative growth in the last two years (2008& 2009).

During the course of the year, the monthly OPEC basket average price settled between $70 /b and $85 /b as the annual average price of the OPEC basket shot up to $77.4 a barrel, representing an increase of $16.4 /b or 27% comparing with 2009.

Organization of Petroleum Exporting Countries (OPEC) continued its long standing role of supporting oil market stability. The significant reduction in production (4.2 million b/d) carried out by OPEC from the beginning of January 2009 was a decisive factor behind the downward trend in prices since the beginning of the year. In addition to many other factors affected the prices, the most important were the fluctuations in the currency exchange markets, excessive speculative activities in the crude oil futures market, developments in global financial markets and global equities, global economic recovery, future outlook, surplus production capacity of crude oil, and adequate levels of global oil inventories.

Chapter One of this report provides a detailed analysis of key developments on the core features of the oil market, and major factors afecting them and their impact on the value of oil exports. It also reviews oil and energy consumption developments in the Arab countries in general, and OAPEC members in particular.

I. MAJOR DEVELOPMENTS IN THE WORLD OIL MARKET IN 2010 AND RELATED FACTORS

In order to shed some light and take a comprehensive look at major developments taken place in the world oil market in 2010, the following sections review in some details various aspects of the market,

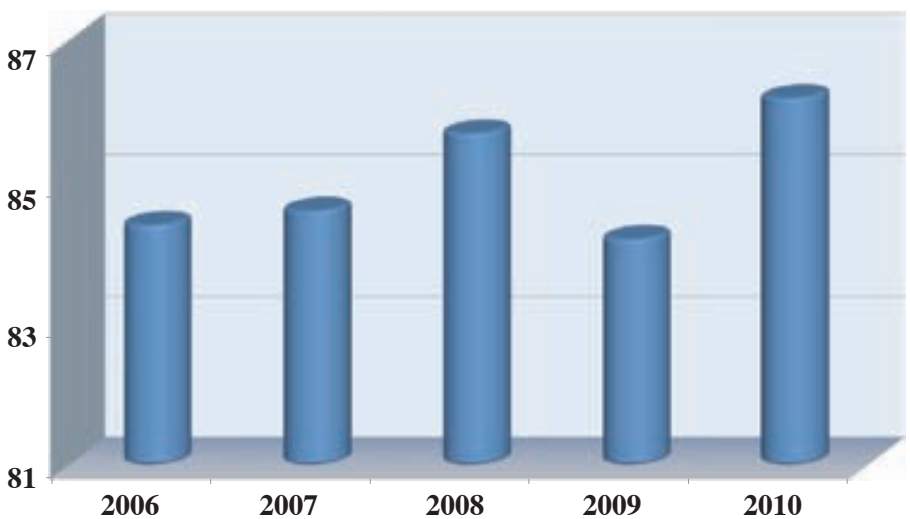
particularly world oil supplies, demand for oil, price trends for crude oil and majors oil products, crude oil freight rates, changes in international oil inventories and their impact on the value of OAPEC members' oil exports.

1. Supplies

Average oil supplies (crude oil and natural gas liquids) in 2010 went up by more than 2.0 million b/d to reach 86.2 million b/d, or 2.5%, compared with the previous year, as shown in Table (1-1) and Figure (1-1).

Figure 1-1

World Supplies of Oil and NGL's, 2006-2010
(Million b/d)



Continuing the upward trend of oil supplies which started in the third quarter of 2009, the first quarter of 2010 has witnessed an increase in global supplies by 700,000 b/d comparing with last quarter of 2009 to reach about 86 million b/d. In the second and third quarters, oil supplies continued to rise with the same rates to rebound again in the fourth quarter of 2010 as oil supplies increased by 1.0 million b/d.

The recovery of the world economy from global financial crisis has had a positive impact on this side of oil market, noting that the main source of increase in supply was from non- OPEC countries in addition to the increase in OPEC production of natural gas liquids.

1-1 OPEC Supplies

In 2010, OPEC countries' oil supplies (Crude Oil and Natural Gas Liquids) hiked by around 1.0 million b/d, or about 3 %, to stand at 40 million b/d. This rise came after the recorded decrease of 2.3 million b/d in the previous year of 2009. The increase in 2010 brought OPEC countries' share of total world oil supplies to 39.4%, compared with 39.2% in the previous year, as shown in Table (1-1).

OPEC supplies of natural gas liquids and unconventional oil rose from 4.6 million b/d in the first quarter of 2010 to 5.0 million b/d in the fourth quarter. On the other hand, OPEC supplies of crude oil were at a level of 29.2 million b/d in the same period. This attributed mainly to the signs of improvement in the world economy and its positive impact on the world demand for oil.

It is noteworthy in this context that despite the recovery in global economy and the subsequent rise in oil demand during the year, OPEC members continued to implement the decisions already taken in 2008, and the latest of which was taken in December 2008, providing a total reduction of 4.2 million b/d in production ceiling from the beginning of 2009.

Through frequent monitoring of the world oil market situation, OPEC held one extraordinary meeting in the course of 2010, in addition to its two ordinary meetings. The Organization opted to keep production quotas unchanged for the whole year, which was a decisive factor in bringing stability to oil prices. Below are some details about the OPEC's meetings during the year:

- OPEC held its first ordinary meeting at its headquarters in Vienna on 17 March 2010, in spite of the world economic recovery from the financail crisis and the high demand for oil, it was agreed to keep production quotas unchanged. The decision was taken in line with the fragile nature of the improvement in global economic growth and Sovereign debt crisis in some developed countries, in addition to the increase in non-OPEC oil supplies and high levels of oil stocks in OECD countries. OPEC members affirmed to take all necessary measures to stabilize the oil market.

- At its second ordinary meeting on 14 October 2010, OPEC noted that despite signs of improvement in the global economy, there are still concerns on the speed of the recovery, especially in the major industrialized countries. In addition, market fundamentals are still weak despite the improvement of global oil stocks in OECD countries. Accordingly, since the market remains over- supplied and given the downside risks associated with extremely fragile recovery, OPEC decided once again to keep quotas unchanged and reiterated member countries commitment to market stability and ensuring sufficient supplies.

- OPEC's first extraordinary meeting of the year was held in Quito, Ecuador on 11 December 2010. In light of expectations of rising demand for oil over 2011 with a rate below the one seen in 2010, in addition to risks and challenges surrounding the fragile world economic recovery such as negative results of fears that a second

banking crisis in Europe could lead to other negative impacts on the global oil demand, OPEC has decided for the third time during the year, to keep its production ceiling unchanged as it saw an abundance of oil surplus along the whole chain of oil supplies in addition to the high rates of unemployment suffered by the industrialized countries. OPEC encouraged other producing countries to cooperate with its member to ensure stability in world oil market.

1-2 Non-OPEC Supplies

Non-OPEC oil supplies came to 52.2 million b/d in 2010. This is an increase of 1.1 million b/d compared to supplies in 2009, the increase in 2009 was 700,000 b/d only, as shown in Table (1-1).

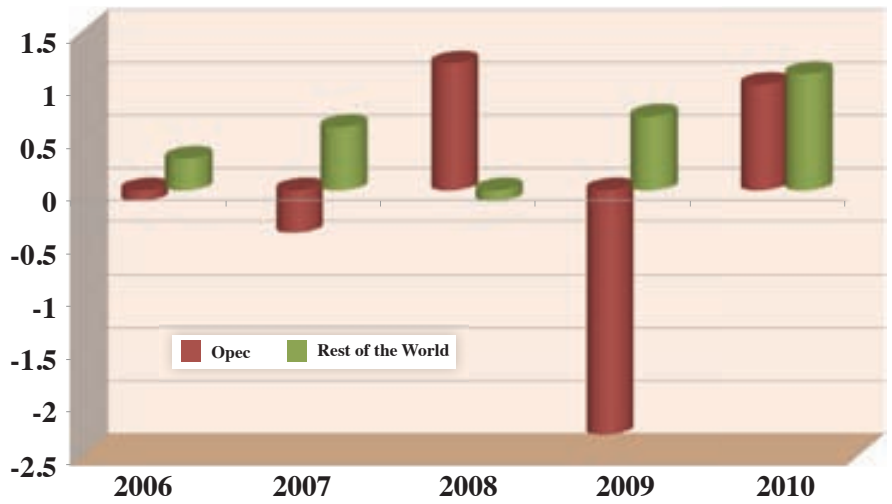
Despite the traditional decline experienced by some groups, the bulk of the increase in Non-OPEC oil supplies came from the United States, which increased production by more than 400,000 b/d in 2010 compared with 2009. Brazil's production rose by 200,000 b/d, Former Soviet Union supplies increased by 300,000 b /d, and Chinese production went up by 300,000 b/d.

In light of the decline in European production, the net increase in oil supplies from OECD countries was so modest (about 150,000 b/d) to reach 19.9 million b/d, while developing countries oil supplies rose by 300,000 b/d.

Figure (1-2) shows the annual change in oil supplies from OPEC and non-OPEC producers in 2006-2010.

Figure 1-2

Annual Change in World Supplies
of Crude Oil and NGL's, 2006 - 2010



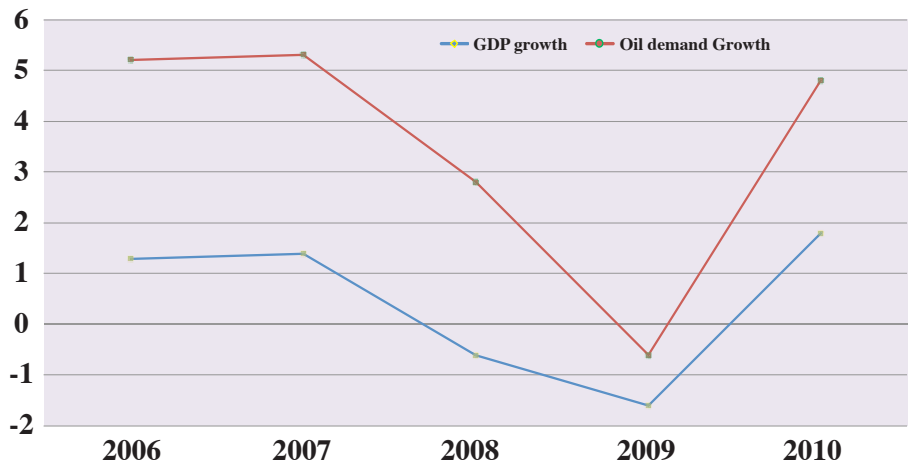
2. World Oil Demand

World oil demand in 2010 bounced back after a continued decline for the second successive year due to the negative consequences of global financial crisis on the world economy. This highlighted the close link between world economic growth rates and world oil demand growth rates. The sharp rise in world economic growth rates from -0.6% in 2009 to 4.5% in 2010 was accompanied by an increase in world oil demand growth from -1.6% in 2009 to 1.9% in 2010.

Figure (1-3) and Table (1-2) show the annual rates of growth in world oil demand compared to the world economic growth rates.

Figure 1-3

World Economic and Demand Growth 2006-2010
(%)



Unexpectedly, most of the world economies witnessed significant increase in their growth rates in the first half of 2010 driven by a remarkable improvement in the industrial sector and global trade. The improvement has continued during the second half of the year, due to the economic stimulus programs implemented by many countries around the world especially in the industrial countries.

In terms of international groupings, the economic growth rate of OECD countries, which accounted for about 53% of the world oil demand, rose from -3.2% in 2009 to 2.8% in 2010.

Among the OECD countries, the annual growth rate of United States economy increased to 2.8%, while the rate of growth in the Japanese economy rose from -5.2% in 2009 to 4.3% in 2010. The growth rate of the euro zone economies went up from -4.1% to 1.5% in the same period.

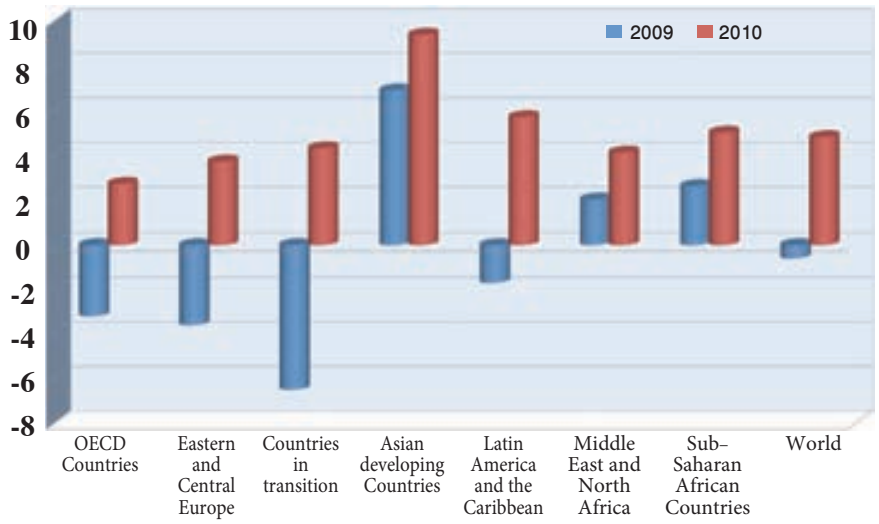
The rest of the world economies of the world witnessed an increase in their economic growth rates from 2.5% in the previous year to 7.1% in 2010.

The developing countries in Asia maintained a high growth in 2010 as they witnessed an increase in annual economic growth rate of 9.4%, compared with 6.9% in 2009, while African and Middle Eastern countries, recorded a rise of 5% in their economic growth rate compared with 2.6% in 2009. The Latin American countries also witnessed an increase in their economic growth rate from -1.7% in 2009 to 5.7% in 2010, as shown in Figure (1-4) and Table (1-3).

Figure 1-4

World Economic Growth 2009-2010

(%)



By tracking the growth rates of world oil demand in 2010, it is obvious that fluctuations of growth rates represent a response to the economic recovery which dominates the general world scene. However, the first quarter of the year was marked by disappointment in the level of growth of oil demand in industrial countries and a relative slow growth in the developed countries, leading the world demand for oil to stand at 85 million b/d, a level that 500,000 b/d lower than the fourth quarter of 2009.

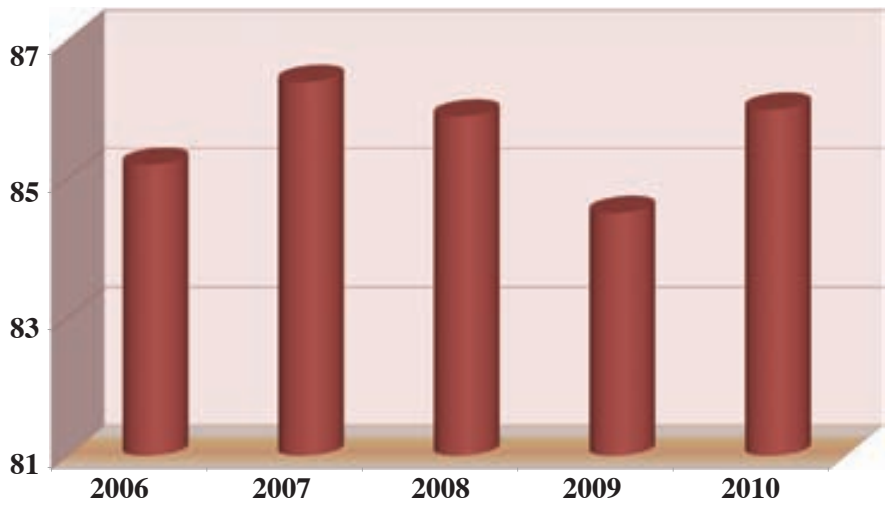
The second quarter of 2010 has witnessed a slight increase in oil demand, the big jump in demand was observed in the third quarter, the growth was up by 2.2 million b/d over the second quarter to reach 87.4 million b/d, this trend changed in the fourth quarter of the year when demand decreased by 0.6 million b/d compared to the third quarter.

This development was reflected in the expectations of world oil demand in 2010 which issued on monthly basis by the key international institutions. OPEC's forecast data issued in the first quarter of 2010 indicated a rise in world oil demand by 0.8 million b/d, but the forecast has been revised during the course of the year to more increases, 0.9 million b/d and 1.0 million b/d by the end of second quarter and third quarter of the year respectively. Thus 56% of the total forecasted increase was observed in the fourth quarter of the year.

Moderate economic growth rates had a positive impact on world oil demand growth, which rose by 1.6 million b/d, indicating a growth by 1.9%, over its 2009 level. World oil demand in 2010 jumped to a record high of around 86.1 million b/d, as shown in Figure (1-5) and Table (1-4).

Figure 1-5

World Oil Demand, 2006-2010
(million b/d)

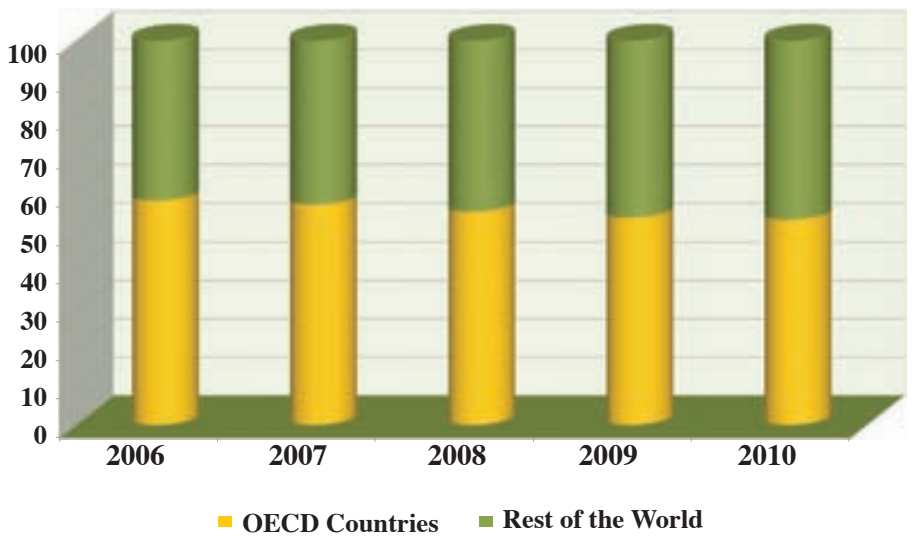


The level of demand for oil varied in accordance within the international grouping. Whilst it increased in the OECD countries in 2010 by 500,000 b/d from its 2009 level to 46 million b/d, it rose in the rest of world countries by 1.1 million b/d, comparing to previous year level.

The change in demand levels of each grouping altered their shares in total world demand in 2010. The share of the OECD countries declined from 53.8% in 2009 to 53.4% in 2010, while that of the rest of world countries rose from 46.2% to 46.6%, as shown in Figure (1-6) and Table (1-5).

Figure 1-6

Distribution of World Oil Demand by Region, 2006-2010
(%)



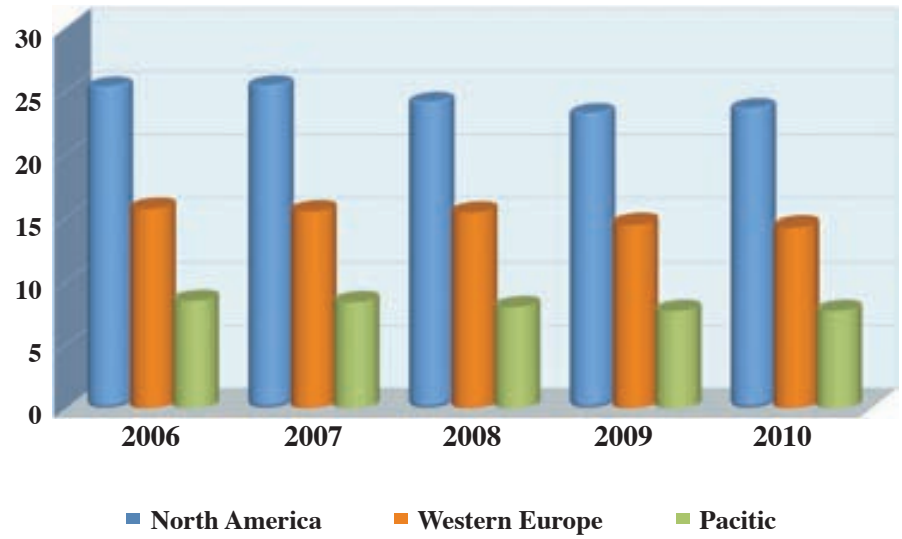
Developments in world oil demand by international grouping are examined below.

2-1 OECD Countries

The OECD countries' demand for oil in 2010 increased by about 500,000 b/d, or 1.1% from its 2008 level to hit 46 million b/d. The total increase came from North American countries, where demand rose by 500,000 b/d to reach 23.8 million b/d. In Asian industrial countries; demand for oil reached 7.8 million b/d, representing a modest increase of 100,000 b/d. On the other hand demand for oil in West European countries fell by 100,000 b/d reaching 14.4 million b/d, as shown in Figure (1-7) and Table (1-6).

Figure 1-7

OECD Demand for Oil by Region, 2006-2010
(Million b/d)



Developments in US economy are considered as the most important factor in world oil consumption. In the last few years, United States consumption of oil became as an unpredictable factor with respect to the global demand for oil. After weak growth in the first half of the year, signs of improvement in American consumption emerged during the third quarter, particularly in September. US demand for oil increased by 400,000 b/d in 2010 due to the increase of distillate and fuel oil consumption, while gasoline consumption has witnessed a modest growth. The increase in US demand for oil was also a result of the US economic stimulus programme implemented by the US administration, which had a direct impact on the industrial and financial sectors.

With regard to European industrial countries, largest four countries (German, France, Italy, and United Kingdom) showed a weak consumption of oil in the last seven years. Despite the economic stimulus programmes which aimed to raise the rates of economic growth, the growth rate of oil demand was -0.7% in 2010, the most affected sectors in the European countries were the transport and the industrial sectors.

Demand for oil in Japan was characterized by a downward trend during the last few years, this was due to the economic downturn and the increase in energy efficiency and energy policies which were adopted by Japanese government, in addition to the aged population in Japan. Despite these difficulties, Japan was able to achieve modest growth in oil demand during 2010 which attributed to the use of naphtha in petrochemical industry and the compelling shift in direct use of crude oil as a fuel in a power plants.

Analysis oil demand in OCED on a quarterly basis in 2010, estimates of OPEC indicate a decline by 600,000 b/d in the demand of the group during the second quarter of 2010 comparing with the first quarter of the same year, representing an increase of about 1.8% comparing with the same quarter of previous year, followed by an increase of 1.4 million b/d, or 3.1% in third quarter comparing with the second quarter of 2010.

Due to the significant contribution of the demand of this group to world oil demand, the rise in its demand during the third quarter of 2010 was reflected in the world total which rose by 2.4 million b/d in the same period comparing with its level in the first quarter, and by 2.7 million b/d comparing with the same level of last quarter of 2009. In the fourth quarter, OCED oil demand has witnessed a decline by 400,000 b/d compared with the third quarter and a level that was slightly higher than the same quarter of the last year.

2-2 Developing Countries

Comparing with 2009 levels, the demand of developing countries (including China) in 2010 increased by 1.1 million b/d, or 3.2% to reach 35.4 million b/d representing a level that never reached before. It is worth mentioning that demand of developing countries is the main engine of the world oil demand, as it witnessed an increase by about 5.0 million b/d in 2010 compared with the level recorded in 2006.

Among this grouping, demand in the Middle East and Africa rose by around 200,000 b/d to 10.5 million b/d, of which the Arab countries accounted for 5.7 million b/d, representing a share of 50% of increase of the region's demand and about 9% of the increase in the developing countries demand. The increase is primarily due to the high economic growth rates in most countries of the region, in contrast to other countries of the world. The demand of other countries in MENA region went up slightly by 100 thousand b/d from 4.7 million b/d in 2009 to 4.8 million in 2010.

All the increase in the Arab countries demand occurred in OAPEC member countries, where demand grew by 2.1% from 4.8 million b/d in 2009 to 4.9 million b/d in 2010.

Demand in the Asian developing countries rose by 600,000 b/d to 18.7 million b/d in 2010. Chinese demand, which is the main engine of Asian economic growth and recovery, accounting for 47% of total demand in the Asian developing countries, was responsible for 83% of the increase in demand of the Asian developing countries and for 45% of the increase among all developing countries. Chinese demand rose by 500,000 b/d to 8.8 million b/d in 2010. The increase in Chinese demand was partly the result of the increasing use of diesel in transportation and electricity generation sectors, and also reflected potentially stronger demand for other products, such as liquefied petroleum gas and naphtha which are used as feedstock in petrochemical industry.

Despite the increase in oil consumption in the transport and industrial sectors in India, some other sectors (especially Agriculture sector) witnessed a decline in the consumption due to bad weather conditions. As a result, demand for oil in India's economy, the other engine for Asian economies' growth, remained unchanged from its previous year level of 3.2 million b/d. While demand in the Latin American went up by 5.1% to 6.2 million b/d, as shown in Table (1-7).

2-3 Countries in Transition

In 2010, oil demand in the countries in transition remained close to last year level of 4.7 million b/d, as shown in Table (1-8).

3. Price Trends

3-1 Crude Oil Prices

The year 2010 has witnessed a relative stability in world oil prices, despite the fluctuations during the year, compared with the instability during the last two years. Price of OPEC basket of crudes was moving within the range of $70 /b to $85 /b in most of the times during the year.

The annual average price of OPEC basket was up by $16.4 /b, or 27%, as the spot price averaged $77.4 /b, compared with $61 in 2009.

On quarterly basis, the average price of OPEC basket in the first quarter was about $75.4/b, representing an increase of $1.1/b or 1.5%, compared with the fourth quarter of previous year, rising slightly in the second quarter by $1.2/b, or 1.6%, compared with the first quarter to $76.6/b. Then it fell down by about $2.8/b, or 3.7% in the third quarter, to $73.8/b. However, in the last quarter it went up to $83.8/b, representing an increase of $10/b or 13.6%, compared with the third quarter.

The monthly average price of the OPEC basket remained above the

$72/b in the course of 2010, and at level above $75/b for six months, and at $80/b level or more for three months. (April, November, and December 2010).

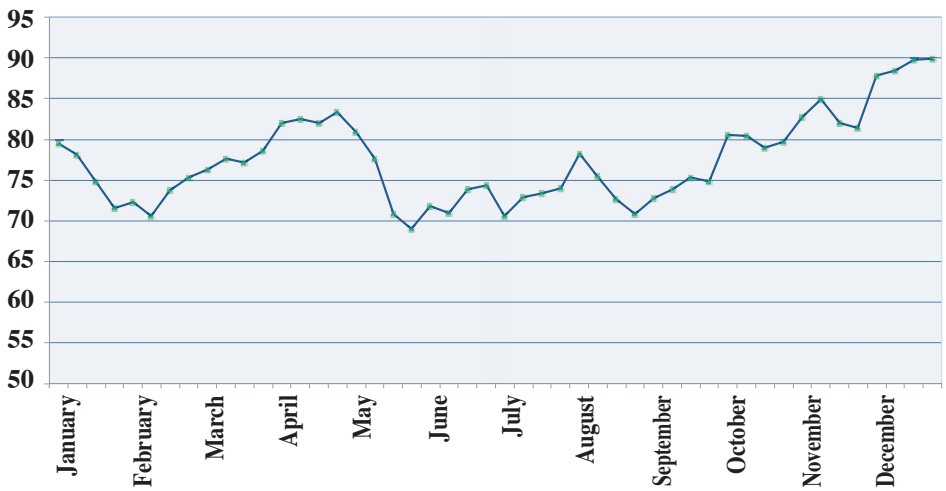
The difference between the highest level of average price of the OPEC basket in 2010 which was recorded in December ($88.6/b) and the lowest that reached in July ($72.5/b) amounted to $16.1/b, compared to a difference of $34.9/b between the highest and lowest level of monthly average price in 2009, as shown in Table (1-8).

Figure (1-8) shows the weekly movement of the OPEC basket price.

Figure 1-8

Weekly Movement of OPEC Basket of Crudes, 2010

($/b)



The price stability within the range of $70/b to $85/b most of the time during the year was due to several factors including ones that have to do with market fundamentals, while others, are outside the scope, of that:

- Organization of Petroleum Exporting countries' efforts played a key role in restoring balance and stability in the oil market, as the significant reduction in production carried out by OPEC from the beginning of January 2009 was a decisive factor behind the

downward trend in prices since the beginning of the year. The continued application of OPEC's reduction throughout the period 2009-2010 helped reducing the surplus of supply in oil market.

- Economic stimulus programs implemented by governments, especially in industrial countries, led to economic recovery from global financial crisis which reflected positively on the demand for oil which in turn resulted in an increase in oil prices during the year.
- The confidence generated by both producing and consuming countries on the need to stabilize prices at a fair and suitable level to ensure the necessary investments for the oil industry on the one hand, and to support the world economy on the other.
- The increasing integration between different energy sources as prices of oil, coal, natural gas, bio fuels, and renewable were no longer independent of each other as was the case few years ago. This is due to the increasing flexibility of substitution from one source to another in different sectors with varying degrees.
- Despite its relative stability, fluctuations have occurred in daily OPEC basket prices during the year, with OPEC Reference Basket fluctuating between $70/b and $85/b and outside this range sometimes, as a result of different effects, these include:
- As an extension of the global financial crisis, Sovereign debt crisis in Euro Area, which started in Greece in the first quarter of year and in Ireland in the fourth quarter of same year, had great impact on global money and equity markets, all of these led to growing concern in the markets about the sustainability of fragile economic recovery in Europe.
- Abundance of supplies in the market with high levels of crude oil, and oil products stocks and high levels of spare production and refining capacities.

- Fluctuations in exchange markets all over the world, known as (Currency war), and in particular between U.S.A and China, led to fluctuation in the value of US Dollar which in turn affected oil prices given the existing strong inverse relation between oil prices and exchange rate of US dollar.
- Despite the measures taken in some industrialized countries to avoid both the fluctuation in the prices and excessive speculation in the market, high speculation activities were still playing as main factor of high level of fluctuation in oil prices during the year.
- Cold weather conditions, especially in Europe and U.S.A, were considered among the main motives behind the rise of daily rate of OPEC basket price to high levels exceeded $90/b in some days in December 2010.

The year 2010 witnessed developments in the pattern of price differentials, where the differentials between light sweet crudes and heavy sour crudes widened to unusual levels compared with previous year. For example, the differential between Dubai crude (representing the heavy crudes) and US light sweet crude reached around $1.3/b in 2010 compared with only $0.1/b in the previous year. The price of Dubai was $1.5/b below Brent in 2010 while it was in the same level in 2009. The same applies for the price of OPEC basket, which was $2.0/b lower than the price of U.S. light sweet crude in 2010 compared to $0.9/b higher in the previous year. The price of OPEC basket also was $2.2/b lower than the price of Brent crude in 2010 compared with $0.7 /b higher in 2009. Those developments in price differentials can be attributed to several factors, including:

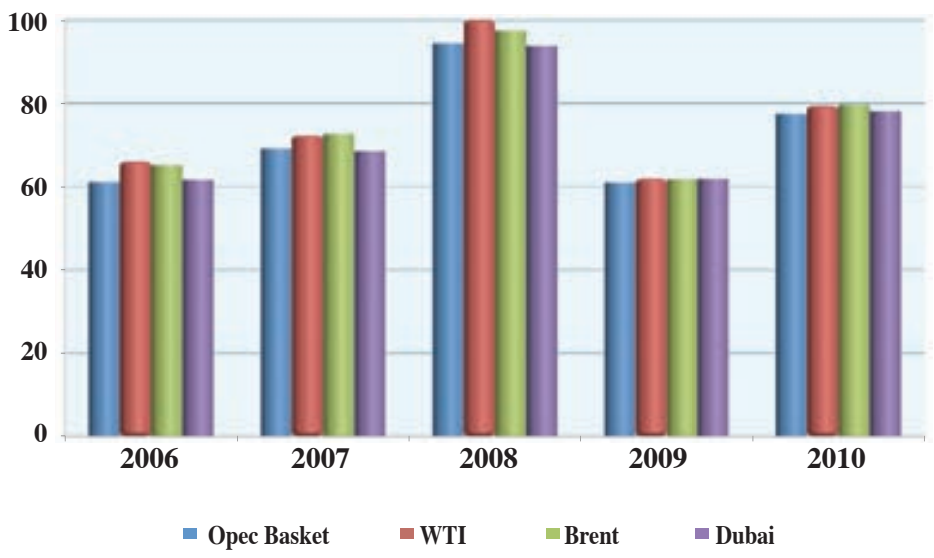
- Increasing demand for distillate during the year due to the increase in using gasoil/diesel in transport and electricity generation sectors, especially in China, and also using gasoil/diesel as a heating fuel, in very cold weather conditions.

- The bottlenecks and logistical problems of U.S. light sweet crude have negatively affected its price during the year compared with other crudes prices, including light crude. The differential between U.S. light crude and Brent was at $0.2/b in 2010 in favour of Brent, compared with similar differential in the previous year but in favour of U.S. light crude, and with a differential of $2.6/b in 2008 in favour of U.S. light crude. These raised doubts about its continuation to be appropriate reference crude, that was the main reason behind replacing it with a basket of heavy American crudes as reference to the U.S. market by Saudi Arabia and Kuwait last year followed by Iraq this year.

Table (1-9) and Figure (1-9) show the developments of differentials among the annual average prices of OPEC basket, U.S. light crude, Brent and Dubai for the period 2006-2010.

Figure 1 - 9

Annual Average Prices of OPEC Basket, U.S Crude, Brent, and Dubai for the Period 2006-2010 ($/barrel)



Spot prices for various Arab crudes followed the same general trend, since they went up in 2010 compared to their levels in 2009 with various degrees. However, the average price of light sweet crudes rose more sharply than that of heavy sour crudes. This led to maximizing the differential between different crudes.

Algerian crude increased by $18/b or 28.9% compared to previous year to $80.4/b, while Kuwaiti crude went up by $15.6/b or 25.7% to $76.3/b. This led to maximizing the differential between the two crudes from $1.7/b in 2009 to $4.1/b in 2010.

Saudi Arabian light crude rose by 26.7% to $77.8/b, the UAE's Murban crude increased also by 25.2% to $79.9/b, Libyan Sidra saw stronger increase of almost 28.6% to $79.1/b. While Qatar Marine crude and Iraqi Basra increased by 25.3% and 26.9%, to $87.2/b and $76.8/b respectively, as shown in Table (1-9).

The nominal value of the increase in crude oil prices of $16.4/b during 2010 was slightly different from its real record value measured in 1995 prices, after adjustment according to the index, which represents the GDP deflator of industrial countries. The real price increase amounted to $12.3/b, or 25.6%, to reach an average of $60.4/b during 2010, as shown in Table (1-10).

3-2 Spot Prices for Oil Products

There was a huge increase in the annual average prices of various oil products on all major markets in 2010, although the amounts varied according to the product and the market.

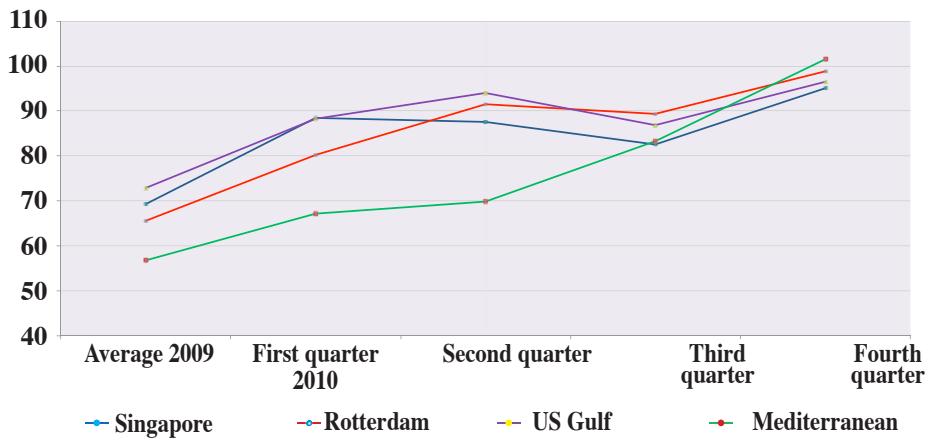
3-2-1 Premium Gasoline Prices

The average price of gasoline in the US Gulf in 2010 was $91.5/b, indicating an increase of $18.6/b, or about 25.5%, comparing with its level

in 2009. In the Mediterranean market the average price went up to $80.5/b, an increase of about $23.7/b, or 41.7% above 2009, and in Rotterdam market the average price rose to $90/b, an increase of about $24.4/b, or 37.2%, above 2009. As for the Singapore market it reached $88.4/b which was $19.1/b, or about 27.6% higher than in 2009. Consequently, the US market achieved the highest prices of all four markets in 2010, Rotterdam and Singapore came next, while Mediterranean achieved the lowest as shown in Table (1-11) and Figure (1-10).

Figure 1-10

Premium Gasoline Prices, 2009-2010
($/b)

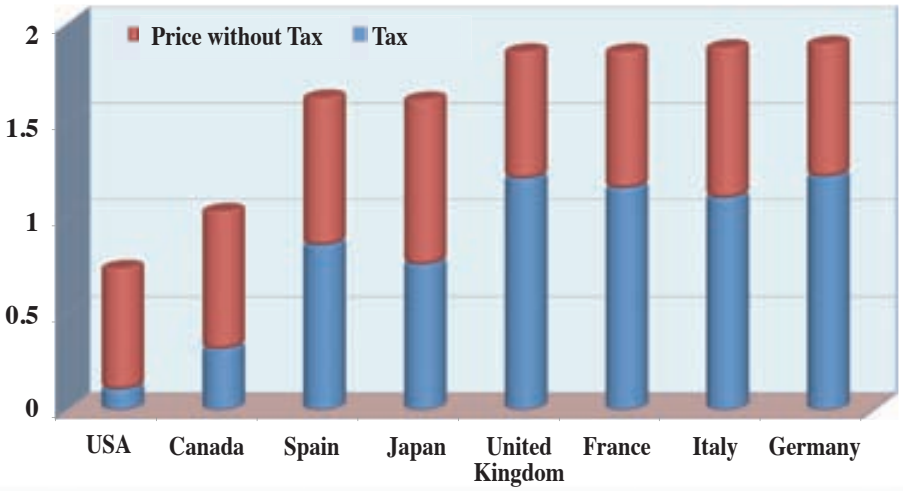


A comparison of final price of gasoline in some OECD countries showed that it was the lowest in US market, owing to the low taxes in that market.

In October 2010, taxes amounted to about 14.7% of the final consumer price of gasoline in United States of America, compared with 31.2% in Canada, 47.1% in Japan, 53.1% in Spain, and over 58% in some other European countries (63.7% in Germany, 64.6% in United Kingdom, 61.7% in France, and 58.4% in Italy), as shown in Table (1-12) and Figure (1-11).

Figure 1-11

Gasoline Prices in some OECD Countries, October 2010
($/litre)



3-2-2 Gasoil/Diesel Prices

Gasoil prices in 2010 were relatively high in most markets compared with gasoline and fuel oil, because gasoil is in demand throughout the year, especially in the transportion, heating and cooling sectors. The highest increase occurred in US market, where gasoil prices were 31.1% higher than in 2009, as the average annual price rose to $88.1/b. The Rotterdam market came next with a decrease of 30.1%, bringing the average price to $90.4/b, then the Singapore went up by 28.9%, giving an average price of $90.9/b, and finally on the Mediterranean market where it increased by 16.9% to $89.4/b.

3-2-3 Fuel Oil Prices

Fuel oil prices went up in 2010 in all markets. In the US market the average price rose by 24.7% to $71.8/b, in the Singapore market it increased by about 27.6% to $73/b, in the Mediterranean market the

average price of fuel oil went up by 28.8% above 2009 to $71.5/b, while price in the Rotterdam market averaged $72/b, which was 32.6% higher than previous year.

3-3 Oil Freight Rates

Crude oil freight rates on all routes witnessed a sharp increase in 2010 compared with their 2009 levels for several reasons, mainly to the economic recovery of the global financial crisis which resulted in an increase in oil demand which in turn led to a rise in global oil trade and subsequently an increase in the demand for all tankers.

The average rate for oil shipments from Arabian Gulf ports to the East on VLCCs (230,000-280,000 dead weight tonne) was 73 points on the World Scale (WS)[1]. This was 31 points, or 74% higher than in 2009.

Freight rates for shipments from Arabian Gulf ports to the West, on crude carriers with a capacity of 270,000-285,000 dead weight tonne, averaged 51 points on the WS, which was 20 points, or about 64.5% higher than in 2009, as shown in Table (1-13).

In the Mediterranean region there was a similar increase in freight rates for small and medium-sized tankers (80,000-85,000 dwt). The average freight rate in 2010 was 117 WS points, which was 34 points, or about 41% higher than in 2009.

It is worth mentioning that in January 2010 crude oil freight rates on the Arabian Gulf ports to East and West routes registered the highest level, to Average 108 and 68 WS points respectively. Then freight rates started to fluctuate up and down to reach their lowest level in October, after that they went up and down in December 2010. In cross

1- World Scale is a method for calculating freight prices. One point on the WS means 1% of the standard price for freight that direction in the WS boo, which is published annually by the world scale association. It contains a list of prices in the form of dollars per ton, called "World Scale 100" for all the major routes in the world.

the Mediterranean route freight rates started with 123 WS points and then they began to fluctuate up and down till reached their highest level of 174 WS points in May. Freight rates cross the Mediterranean route then changed course to reach their lowest level of 87 WS points in September 2010.

4. World Oil Inventories

The year 2010 witnessed a significant rise in total world oil stocks (commercial and strategic) as they rose by about 100 million barrels, or 1.4%, to 7047 million barrels at the end of December 2010. Crude oil stocks at sea, and independent stocks near consumption centres such as in Caribbean ports and the ports of Rotterdam and Singapore exceeded 1000 million barrels at the end of 2010, totaling 1031 million barrels, a level that 47 million barrels lower than previous year.

Despite the significant increase in the commercial stocks of OECD countries, oil prices took upward trend from the beginning of the year unlike the traditional relationship between stocks and prices.

4-1 OECD Commercial Stocks

OPEC's decisions to cut production quotas by 4.2 million b/d which came in affect at the beginning of 2009 helped to lower the level of oil supplies and in turn affected the levels of commercial stocks in OECD countries in 2010. After the increase of total stocks by 71 million barrel in the second quarter of the year above their level in the first quarter, they fell in the third quarter by 11 million barrels below second quarter levels.

In the last quarter of 2010 there was a significant decrease of 45 million barrels compared with the previous quarter, bringing them to 2705 million barrels at year end. In 2010, days of forward consumption of all commercial stocks in the OECD countries went up to reach a level of 59.7 days, which is higher than the usual average.

4-2 US Strategic Petroleum Reserve

The US Strategic Petroleum Reserve (SPR) passed the 700 million barrel level for the first time in 2008, and continued to be above the mentioned level in 2010 as it totalled 727 million barrels at year end, nearly the same level reached at the end of 2009.

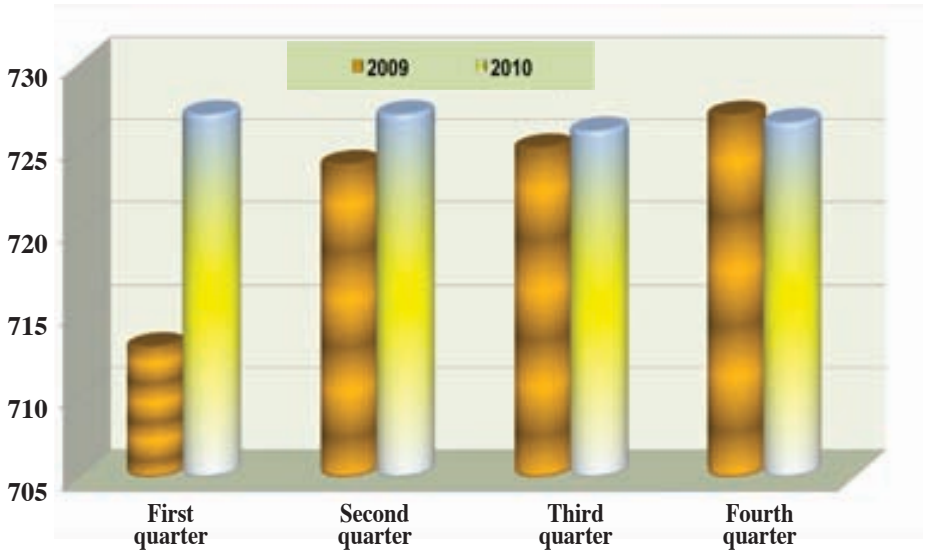
What is more, the SPR did not fall below the 726 million barrel mark throughout the year. After reaching 727 million barrels in the first quarter of 2009, the SPR remained unchanged at the end of the second quarter, then fell slightly to 726 million barrels in the third quarter, and to rise again in the end of the last quarter of 2010.

Since 2004, the US Administration has adopted a more flexible attitude toward releasing quantities of the SPR to compensate for any shortage of supply. This gives more importance to the commercial aspect of the SPR than the previous policy, which regarded the SPR as the last line of defence that can be used only at times of major crisis. As shown in Figure (1-12) and Table (1-14).

The level of usable commercial stocks rose by about 92 million barrels, or 6.9%, at the end of 2010 to 1432 million barrels. The usable commercial stocks are the stocks set aside by oil companies as a precautionary measure to respond to any sudden interruption of supplies or for speculation purposes when prices go up.

Figure 1-12

US Strategic Petroleum Reserve (SPR) at Quarter End, 2009-2010
(Million barrels)



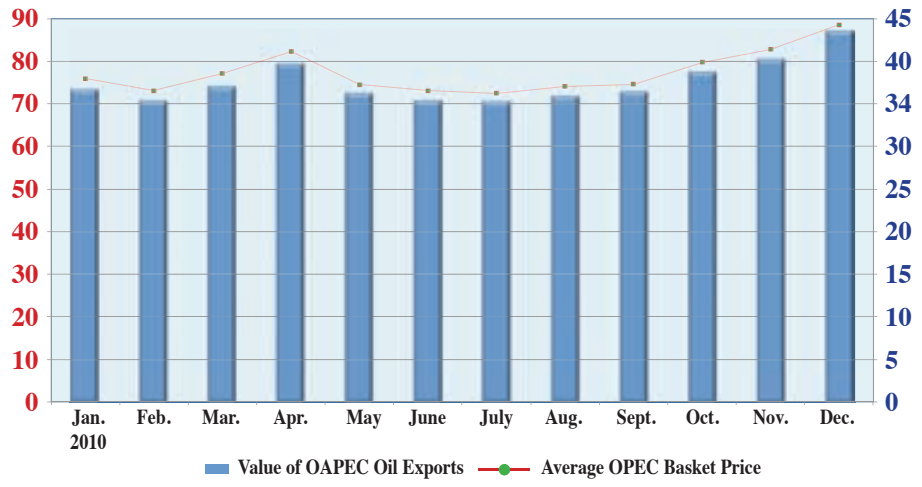
II -VALUE OF OAPEC MEMBER COUNTRIES PETROLEUM EXPORTS

The surge in oil price in 2010, by $16/b, compared with its level in 2009 reflected positively on the value of oil exports. It worth mentioning that oil exports are the main engine of socioeconomic development in the oil producing Arab Countries, the mainstay of their central bank reserves of foreign exchange, and the main source of their budget surpluses.

Monthly data on the movement of oil prices and the estimated monthly value of oil exports in OAPEC member countries may give a clear picture of the positive effects of the increase in prices during the year, as shown in Figure (1-13).

Figure 1-13

Monthly Oil Prices and Value of OAPEC Oil Exports, January-December 2010
($/b)



A year-on-year comparison shows that the value of oil exports of OAPEC members went up by 27.8%, from $352.8 billion in 2009 to $450.9 billion in 2010, or by $98.1 billion. An analysis of individual countries shows that the increase varied from one country to another. It ranged from 25% to 42% in the United Arab Emirates, Algeria, Bahrain, Saudi Arabia, Qatar, Libya, and Kuwait, while it was 23.6% in Iraq and Syria, and 19.7% in Egypt, as shown in Table (1-15).

The value of OAPEC members of oil exports in real 1995 prices, after adjustment according to the index, which represents the GDP deflator of industrial countries, rose from $278 billion in 2009 to $352 billion in 2010, or by 26.5%, as shown in Table (1-16).

III. DEVELOPMENTS IN OIL AND ENERGY CONSUMPTION IN THE ARAB COUNTRIES

1. Arab Countries

Energy consumption growth in the Arab countries is affected by three key variables: Gross Domestic Product, population, and prevailing energy prices on local markets. The following paragraphs provide an overview of these variables.

1- GDP: The negative impact of global financial crisis which launched in the second half of 2008 had spread all over the world economies, including the Arab countries which were affected by various degrees depending on their economic structures and their links with world economy.

Joint Arab Economic Report published in December 2010 classified Arab countries to three groups based on their effects by financial crisis, These groups are:

- **First group:** comprises GCC countries : United Arab Emirates, Bahrain, Saudi Arabia, Oman, Qatar and Kuwait. The first group is characterized by its connection with global financial system and by its dependence on global markets in its foreign trade, especially on petroleum exports.

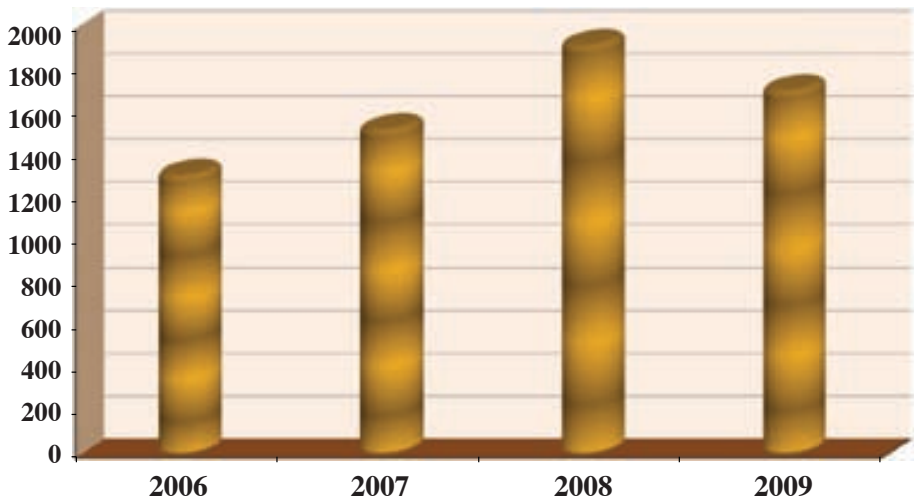
- **Second group:** consists of four countries, Algeria, Sudan, Libya and Yemen. Their local financial markets are not directly linked with global markets, but their economics do depend on oil revenues.

- **Third group:** includes Jordan, Tunisia, Syria, Lebanon, Egypt, Marcos and Mauritian. Their financial systems was not directly affected, but their economies depend greatly on the foreign markets, especially on commodity and services imports or exports. In addition to effects of worker remittance and foreign direct investments.

Data published in the Joint Arab Economic Report in December 2010 indicated that most Arab countries witnessed a decline in growth rates. The data showed that GDP growth rate in constant prices in Arab countries reached 11%. GDP in Arab countries decreased from $1925 billion in 2008 to $1713 billion in 2009, due to shrinking of petroleum revenues as a result of deterioration in oil prices. Figure (1-14) shows the development of Arab Countries' GPD in current prices 2006-2009.

Figure 1-14

Arab Countries' GPD in Current Prices 2006-2009
(billion $)

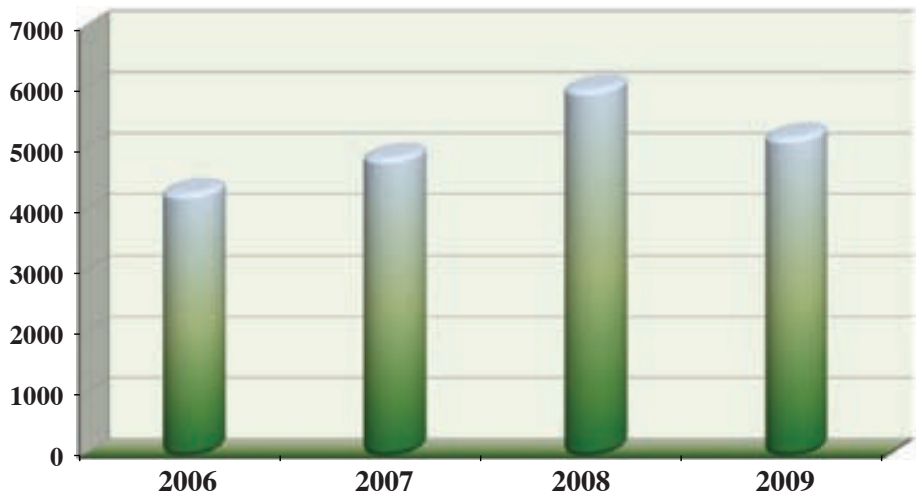


The overall average energy intensity in the Arab countries was about 6.1 kg of oil equivalent per $1000 of GDP in 2009.

The per capita GDP of Arab countries in current prices rose by 6.6% in 2006-2009 from $4308 in 2006 to $5221 in 2009. Eight countries had a higher per capita GDP than the overall average for the Arab countries, namely, Qatar ($59984), the United Arab Emirates ($44538), Kuwait ($34717), Bahrain ($16950), Oman ($15249), Saudi Arabia ($14550), Libya ($8469), and Lebanon ($8383), as shown in Figure (1-15).

Figure 1-15

Per Capita GDP of Arab Countries in Current Prices, 2006-2009
($)



The Arab countries whose per capita GDP fell below the average of the Arab countries fall into two groups. The first includes those with a per capita GDP in excess of $2000. The seven countries in this group are Algeria ($3959), Jordan ($3837), Tunisia ($3794), Iraq ($3142), Morocco ($2872), Syria ($2599), and Egypt ($2482).

The second group comprises four countries with a per capita GDP less than $2000. They are Sudan ($1626), Yemen ($1308), Djibouti ($1233), and Mauritania ($923).

2- **Population:** The average population growth in the Arab countries during 2006-2010 was 2.26%, where the population of the Arab countries increased from 316 million in 2006 to about 346 million in 2010.

3- **Prices:** There is no indication that Arab countries in the recent years have resorted to raising the prices of oil products in the local markets in 2010 except Jordan which established a committee consisting of Ministry of Energy and Mineral Resources, Ministry of Finance, and Jordan Petroleum Refinery Company, which conducted monthly meeting in order to review prices of oil products and modify them in line with international prices trends in global markets.

1-2 Energy Consumption by Source

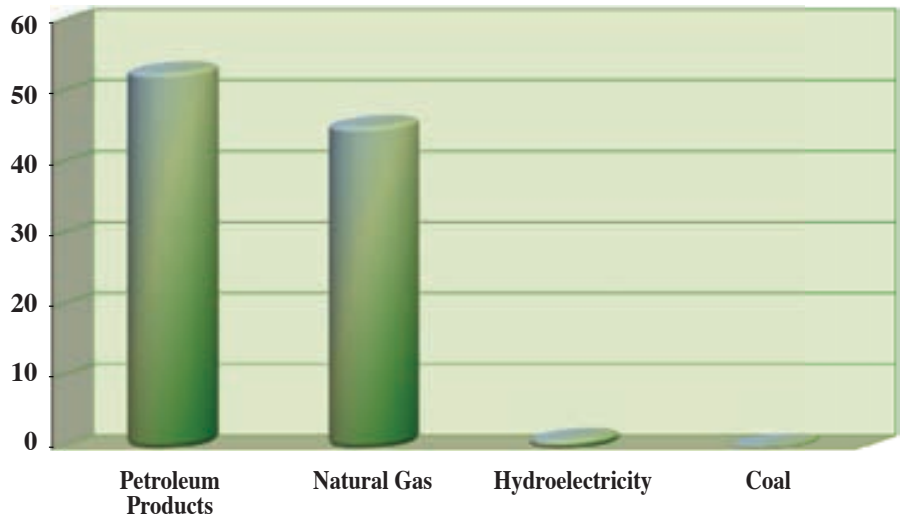
During the period 2006-2010, energy consumption growth in the Arab countries reached its highest rate in 2008 of 8.9% then it retreated to 3.7% in 2009. The growth rate is expected to slow down by 2.9% in 2010 as total energy consumption in the Arab countries will amount to 10.8 million barrels of oil equivalent per day (boe/d) compared to 10.6 million (boe/d) in 2009. The global economic crisis was the main factor behind the downward trend in energy consumption growth rates.

Energy consumption in the Arab countries is increasingly dependent on petroleum (oil and natural gas), which accounted for 98.3% of total energy consumption in Arab countries in 2010. Oil continues to be the main source of energy in the Arab countries, despite the increasing use of natural gas. Oil meets over half of the Arab countries energy requirements, accounting for 52.9% in 2010, compared with 45.4% for natural gas, 1.7% for hydroelectricity, and 0.4% for coal.

Among non-OAPEC Arab countries oil plays an essential role in the energy mix, accounting for 77.3% of their energy needs, compared with 50.4% in OAPEC member countries. On the other hand, natural gas plays a greater role in OAPEC member countries, accounting for 48.1% of their total energy consumption, compared with 18% in other Arab countries, as shown in Figure (1-16) and Table (1-17).

Figure 1-16

Energy Consumption in the Arab Countries by Source, 2010
(%)



The disparity in energy consumption may be attributed to the differing availability of hydrocarbon resources in the Arab countries and to what degree these resources are utilized and developed.

OAPEC members accounted for 90.8% of total energy consumption in the Arab countries in 2010 and other Arab countries for 9.2%.The growth rate of energy consumption in OAPEC members was 5.4% during the period 2006-2010, comparing to 9.2% in other Arab countries.

The difference in energy consumption shares within the Arab countries is due to a range of factors, including :

- The different levels of economic and social development, reflected in the varying degrees of the manufacturing process on the one hand, and on the well-being of Arab countries on the other. The GDP of OAPEC member countries accounted for about 83% of the Arab

countries GDP in 2009. OAPEC member countries accounted for about 64.3% of total Arab population in 2010.

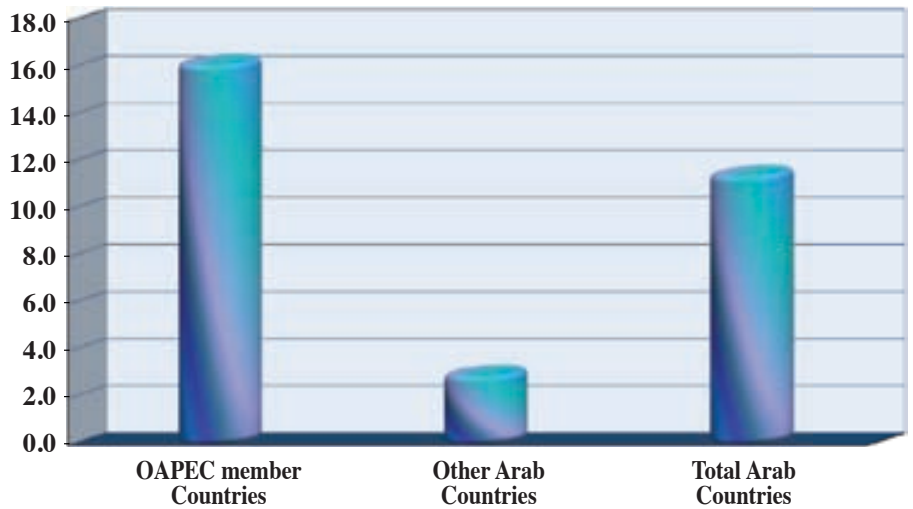
- The size of hydrocarbon resources in Arab countries is playing a crucial role in both economic and social development and on the level of energy consumption. OAPEC member countries possessed 98.1% of the Arab countries crude oil reserves and 97.2% of their natural gas reserves at the end of 2010.

In terms of average per capita consumption of energy in the Arab countries in general, this average is still modest at about 11.4 barrels of oil equivalent (boe) in 2010 compared with 10.2 boe in 2006.

This average hides significant disparities among Arab countries in the rates of per capita consumption of energy, as it reached to 16.1 boe in OAPEC member countries in 2010, compared with 2.9 boe in other Arab countries. Figure (1-17) and Table (1-19) show the per capita energy consumption of the Arab countries in 2010.

Figure 1-17

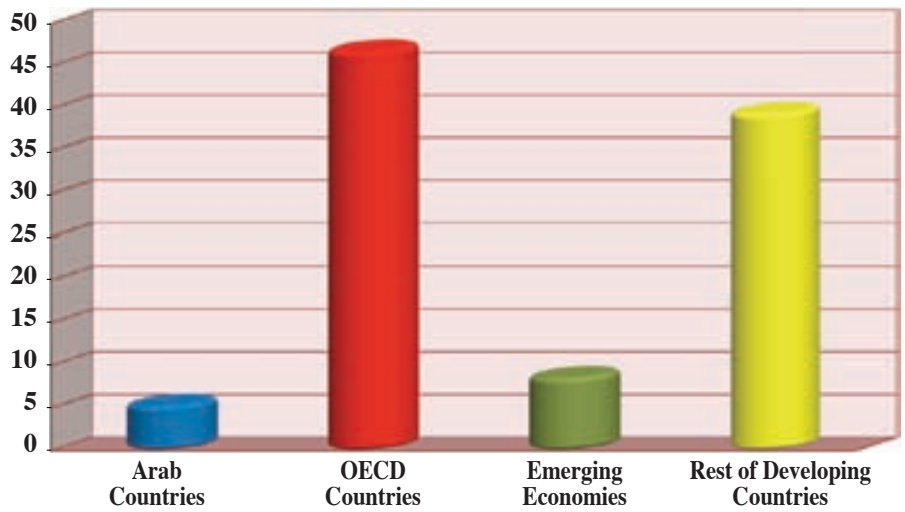
Per Capita Energy Consumption in the Arab Countries, 2010
(Boe/year)



The Arab countries share of total world energy consumption in 2009 was 5.3%, while that of the OECD countries was 46.7%, emerging economies 39.4%, and the FSU countries 8.6%, as shown in Figure (1-18).

Figure 1-18

Energy Consumption in Arab Countries and the World, 2009
(%)



1-2-1 Petroleum Products

The global economic crisis which began in 2008 led to slowdown in the Arab economies, which in turn resulted in dragging the growth rate of petroleum products consumption in the Arab countries from 7.3% in 2008 to 3.4% in 2009 then to 3% only in 2010. The actual consumption of petroleum products in these countries in 2010 amounted to 5.7 million boe/d, compared with 5.6 million boe/d in 2009. Moreover, the share of petroleum products in total energy consumption in the Arab countries in the period 2006-2010 declined from 53.1% in 2006 to 52.9% in 2010.

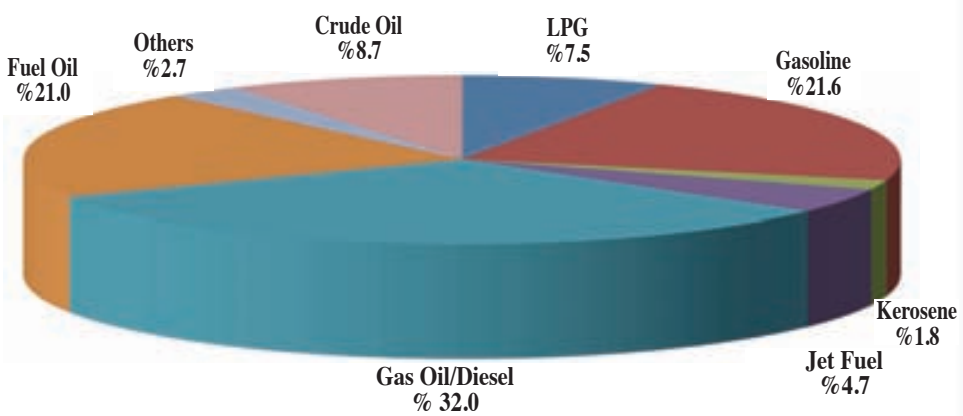
The OAPEC members' share of total petroleum products consumption in the Arab countries in 2010 was 86.6%, while that of other Arab countries was 13.4%.

The relative breakdown of petroleum product consumption in the Arab countries in 2010 puts gasoil/diesel in first place with 32%, followed by gasoline with 21.6%, and fuel oil in third place with 21%. LPG came next with 7.5% of the total, followed by jet fuel with 4.7%, and lastly kerosene with 1.8%.

Crude oil is still used directly as a fuel in power plants and refineries in several Arab countries, accounting for 8.7% of total petroleum products consumption. Figure (1-19) shows the breakdown of petroleum product consumption in the Arab countries.

Figure 1-19

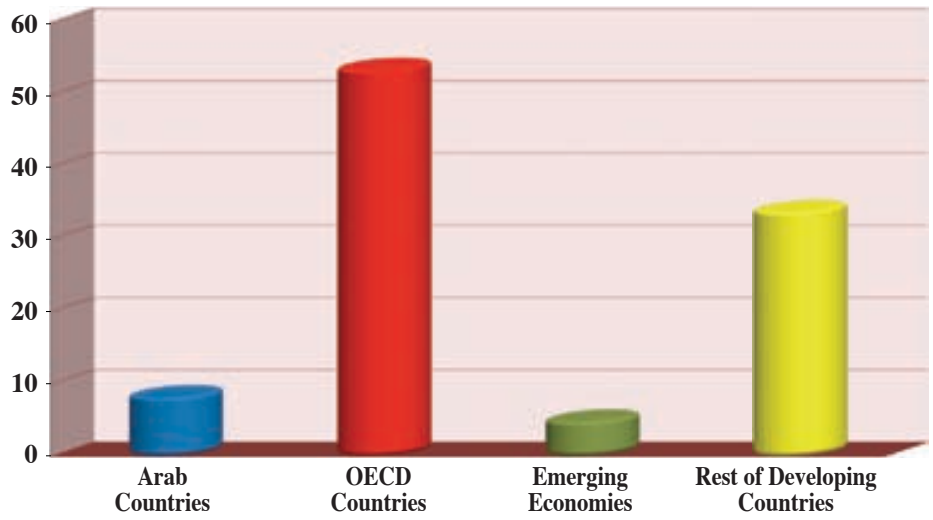
Breakdown of Petroleum Product Consumption in the Arab Countries, 2010 (%)



The Arab countries accounted for 8.1% of world oil consumption in 2009, while the OECD countries took a 53.4% share, emerging economies 33.8%, and FSU countries 4.7%, as shown in Figure (1-20).

Figure 1-20

Oil Consumption in the Arab Countries and the World, 2009
(%)



1-2-2 Natural Gas

Natural gas is the second biggest source in the energy mix of Arab countries. Owing to the huge efforts the Arab countries have exerted to expand its use and increase their dependency on natural gas in meeting their energy needs. Arab countries consumption of natural gas in the period 2006-2010 rose by more than 6%. Annual growth rate of natural gas consumption reached its peak in 2008 when it scored about 11.1% then it retreated to 4.1% in 2009 and to 2.9% in 2010.

Natural gas consumption increased from 3.9 million boe/d in 2006 to 4.9 million boe/d in 2010. This resulted in an increase of the share of natural gas in total energy consumption in the Arab countries from 44.9% in 2006 to 45.4% in 2010.

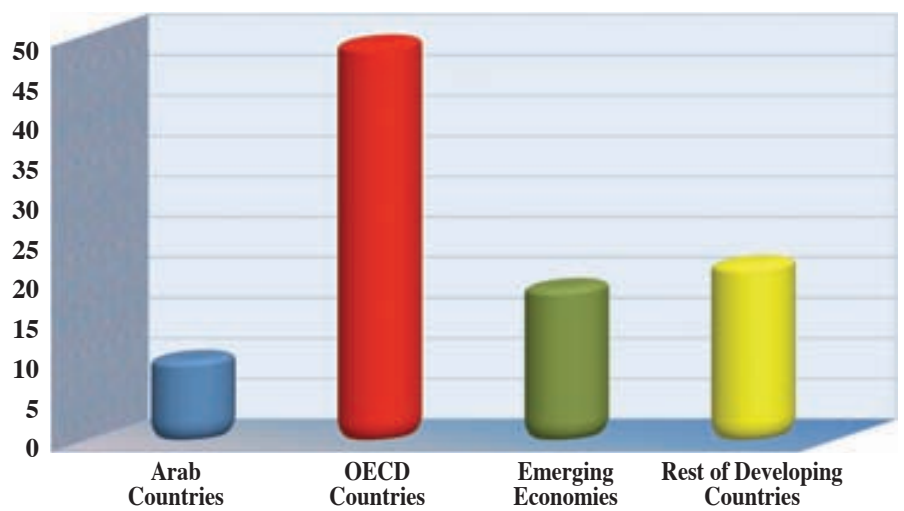
Natural gas is only consumed in a significant way in six Arab countries, Saudi Arabia, the United Arab Emirates, Egypt, Qatar, Algeria, and Libya. These six countries accounted for 82.2% of the Arab countries total consumption of natural gas in 2010.

OAPEC member countries accounted for 96.4% of the Arab countries total consumption of natural gas in 2010. as shown in Table (1-18).

The Arab countries accounted for 10.1% of world natural gas consumption in 2009, while the OECD countries took a 49.1% share, the emerging economies 21.8%, and the FSU countries 19%, as shown in Figure (1-21).

Figure 1-21

Natural Gas Consumption in the Arab Countries and the World, 2009
(%)



1-2-3 Hydroelectricity

The Arab countries have meagre resources of local water needed for building hydroelectricity facilities. This source therefore only makes a limited contribution to the Arab countries' energy mix. There are limited capabilities for generating hydroelectricity in a small number of Arab countries, namely, Algeria, Egypt, Iraq, Lebanon, Morocco, Sudan, and Syria. Initial estimates show that the hydroelectricity production and consumption in these countries were at about 142,000 boe/d in 2010. The share of hydroelectricity in total Arab energy consumption reached 1.3% in 2010.

The Arab countries accounted for 0.8% of total world hydroelectricity consumption in 2009, while the emerging economies accounted for 51.3%, the OECD countries for 40.4%, and the FSU countries for 7.5%.

1-2-4 Coal

Coal resources are only found in a small number of Arab countries, namely, Algeria, Egypt, Lebanon, and Morocco. Even in these four countries, coal makes a limited contribution to the energy mix, with an estimated total consumption of about 47,000 boe/d in 2009, compared with 36,200 boe/d in 2006. Its share of total energy consumption in the Arab countries remained unchanged at the level of 0.4% during the period 2006 -2010.

The Arab countries accounted for 0.08% of world coal consumption in 2009, while the emerging economies accounted for 63.6%, the OECD countries for 31.6%, and the FSU countries for 4.7%.

2- Total Energy Consumption in OAPEC Member Countries

2-1 Total and Per Capita Energy Consumption

The annual rate of growth of energy consumption in OAPEC member countries in 2006-2010 was 5.4%, as total energy consumption rose from 7.9 million boe/d in 2006 to about 9.8 million boe/d in 2010. The highest level of growth was recorded in 2008 reaching 9.4% then declined to reach 3.7% in 2009 and to 3% in 2010.

There was a marked difference between OAPEC member countries in terms of energy consumption during the period 2006-2010. Three groups may be identified:

1- Three members with a growth rate over 6%, namely, the United Arab Emirates (8.2%), Iraq (8.1%) and the Qatar (6.8%).

2- Six members with a growth rate between 4% and 6%, namely, Saudi Arabia (5.1%), Libya (4.6%), Kuwait (4.21%), Syria (4.16%), Egypt (4.1%) and Algeria (4%).

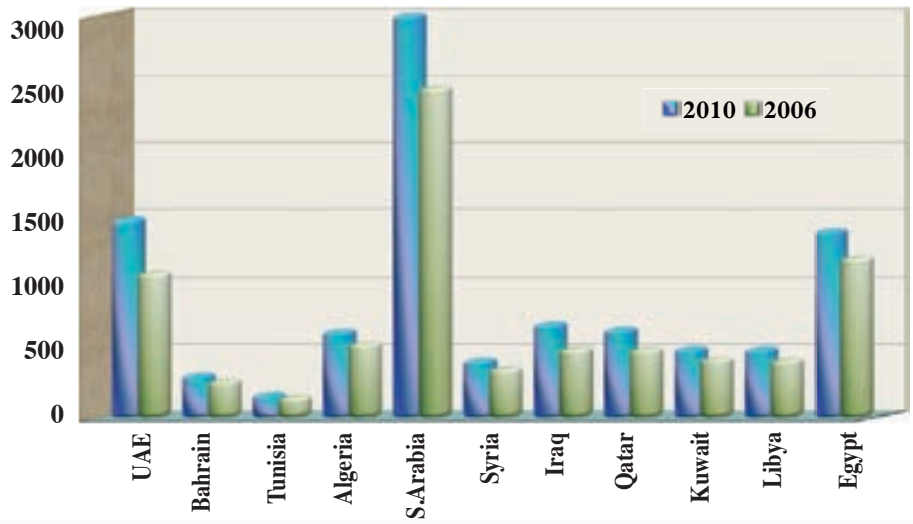
3- Two members with a growth rate of less than 4%, namely, Bahrain (3.9%) and Tunisia (3.5%).

The rise in energy consumption in OAPEC member countries in 2010 is estimated at 284,000 boe/d. It is mainly attributable to six countries: Saudi Arabia (80,000 boe/d), Egypt (40,100 boe/d), the United Arab Emirates (30,800 boe/d), Qatar (26,000 boe/d), Iraq (21,600 boe/d) and Algeria (20,000 boe/d).

The increase in other member countries ranged between 5,000 boe/d in Tunisia and 17,000 boe/d in Kuwait. Figure (1-22) and Table (1-19) compare OAPEC members' energy consumption in 2006 with 2010.

Figure 1-22

Energy Consumption in OAPEC Member Countries, 2006 and 2010
(Thousand boe/d)

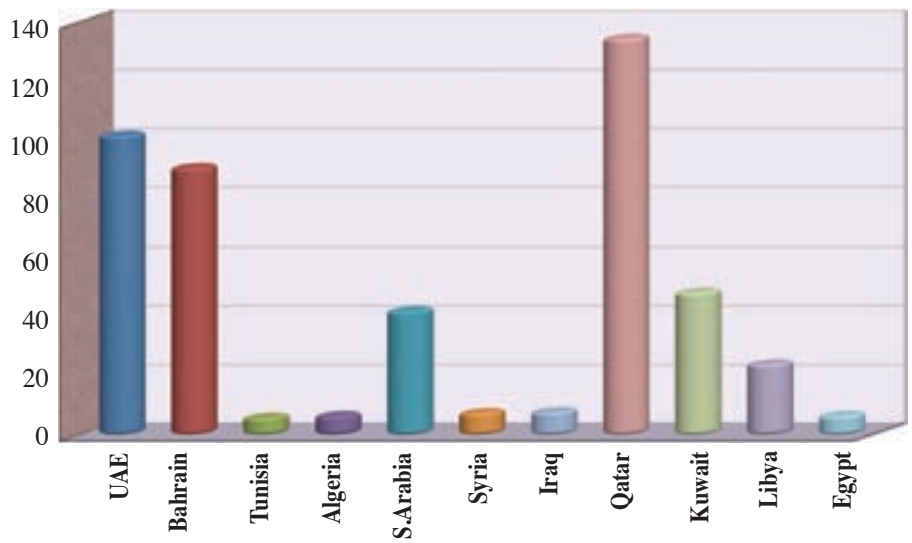


Saudi Arabia accounted for about 27.7% of total Arab energy consumption in 2010, followed by the United Arab Emirates with 13.7%, Egypt with 12.9%, Iraq with 6.5%, Qatar with 6.1% and Algeria with 6%. The per capita rate of energy consumption in OAPEC member countries rose by 3% per annum in the period 2006-2010, from 14.3 boe in 2006 to 16.1 boe in 2010.

This modest growth in per capita energy consumption resulted from the relatively high rate of population growth (2.4%) in 2006-2010, against an energy consumption growth rate of 3% in the same period. The per capita energy consumption rate in OAPEC member countries ranged from 6 boe in Tunisia to 134.6 boe in Qatar. Figure (1-23) shows the per capita energy consumption of OAPEC member countries.

Figure 1-23

Per Capita Energy Consumption in OAPEC Member Countries, 2010
(boe)

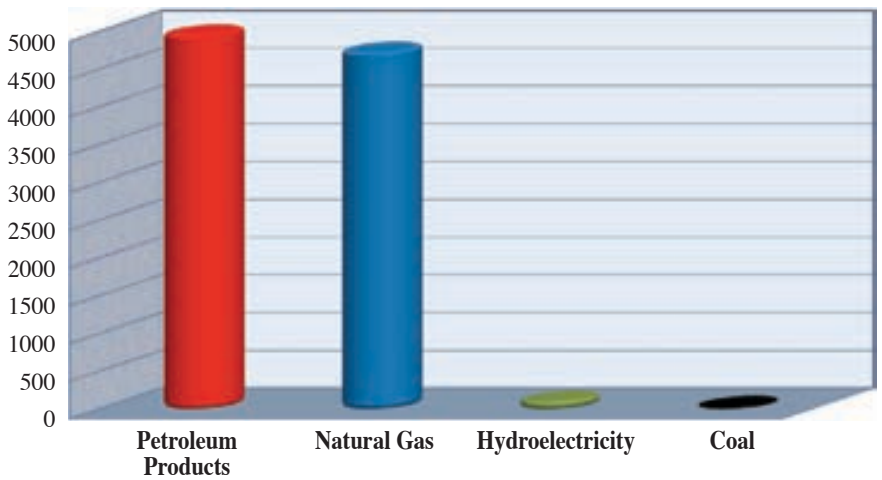


2-2 Energy Consumption by Source

Petroleum products are the main source consumed to meet energy needs of OAPEC member countries. They maintained their top position in the energy mix, despite the decrease of their share in energy mix from 50.5% in 2006 to 50.4% in 2010. In contrast, the share of natural gas in member countries total energy consumption increased slightly from 47.9% in 2006 to 48.1% in 2010. Oil and natural gas cover more than 98.5% of total energy consumption in OAPEC in 2010. The share of hydroelectricity was 1.1%, while that of coal was 0.4%. Figure (1-24) and Table (1-20) show energy consumption in OAPEC member countries in 2010 by source.

Figure 1-24

Energy Consumption in OAPEC Member Countries by Source, 2010
(Thousand boe/d)



2-2-1 Petroleum Products

OAPEC members consumption of petroleum products rose by 5.4% during the period 2006-2010. The growth rate of petroleum products consumption in OAPEC members declined from 7.7% in 2008 to 3.5% in 2009 then to 3.1% only in 2010 to reach 5 million boe/d.

The rise in petroleum products consumption in OAPEC member countries in 2010 is estimated at 149,000 boe/d. It is mainly attributable to five countries: Saudi Arabia (50,000 boe/d), Egypt (20,100 boe/d), Iraq (18,500 boe/d), Kuwait (12,000 boe/d) and Syria (11,300 boe/d). The consumption increase in other member countries ranged between 1,600 boe/d in Tunisia and 10,800 boe/d in The United Arab Emirates, as shown in Table (1-21).

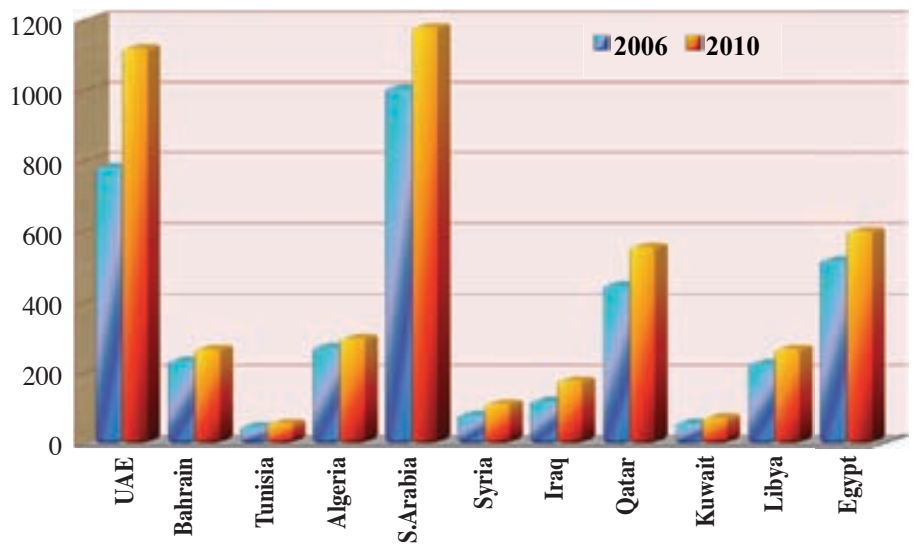
The relative importance of petroleum products in total energy consumption varies from one member country to another. In Kuwait petroleum products accounted for 85.4% of total energy consumption, in Syria 71.5%, in Iraq 71.4%, in Tunisia 65%, in Saudi Arabia 60.7%, 51.1% and 50.1% in Algeria and Egypt respectively . In the remaining OAPEC countries the share of petroleum products ranged between 15.1% in Bahrain and 47.4% in Libya.

2-2-2 Natural Gas

OAPEC members' consumption of natural gas went up by 5.5% during the period 2006-2010, comparing to 5.4% for total energy consumption. Natural gas consumption rose from 3.8 million boe/d in 2006 to 4.7 million boe/d in 2010, as shown in Figure (1-25) and Table (1-22).

Figure 1-25

Natural Gas Consumption in OAPEC Member Countries, 2006 and 2010
(Thousand boe/d)



There is a noticeable disparity between member countries in terms of their reliance on natural gas. Three groups of countries may be identified:

- Countries that depend heavily on natural gas to meet over 50% of their energy requirements. Four countries fall into this category: Bahrain, Qatar, the United Arab Emirates and Libya. The share of natural gas in total energy consumption in 2010 was 84.9% in Bahrain, 84.8% in Qatar, 75.8% in the United Arab Emirates, and 52.6% in Libya.

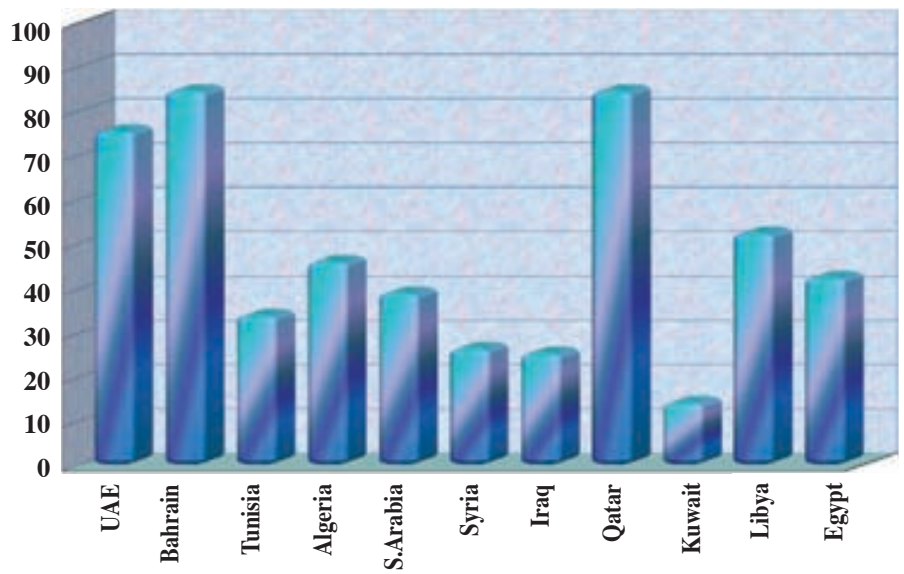
- Countries that depend on natural gas to meet 33% to 50% of their energy needs. The four member countries in this group are Algeria, Egypt, Saudi Arabia, and Tunisia. The share of natural gas in the total energy consumption of these countries was 46.5% in Algeria, 37.8% in Egypt, 39.3% in Saudi Arabia, and 34.3% in Tunisia.

- Countries that rely moderately on natural gas, using it for less than 33% of their energy requirements. The three countries in this group, Syria, Iraq, and Kuwait rely on natural gas for 26.8%, 25.7% and 14.6% of their total energy needs respectively.

Five member countries accounted for about 80% of the total natural gas consumption in OAPEC member countries in 2010. They are Saudi Arabia, the United Arab Emirates, Egypt, Qatar, and Algeria. Their shares of the total OAPEC consumption of natural gas were 25% by Saudi Arabia, 23.7% by the United Arab Emirates, 12.7% by Egypt, 11.8% by Qatar, and 6.3% by Algeria. Figure (1-26) shows the degree to which OAPEC member countries depend on natural gas to meet their energy requirements.

Figure 1-26

Natural Gas Consumption as a Percentage of Total Energy Consumption in OAPEC Member Countries, 2010
(%)



2-2-3 Hydroelectricity and Coal

Hydroelectricity and coal consumption represented low percentage of total energy in OAPEC member countries. Their share in energy mix declined from 1.6% of total energy consumption of OAPEC members in 2006 to 1.4% in 2010.

Hydroelectricity consumption reached about 108,000 boe/d, representing a share of 1.1% of total energy consumption in OAPEC member countries in 2010. Just five member countries use this energy source: Egypt, Iraq, Algeria, Syria and Tunisia. Hydroelectricity consumption in these countries was ranging from 0.2% in Algeria to 5.6% in Egypt, as shown in Table (1-23).

Consumption of coal in OAPEC countries was limited to two members with total of 34,100 boe/d: Egypt consumed about 20,100 boe/d, while Algeria consumed 14,000 boe/d of coal. The share of coal in total OAPEC energy consumption did not exceed 1.4% in 2010, as shown in Table (1-24).

3- Local Prices

As stated before, there is no indication that the Arab countries (except Jordan) raised their petroleum products prices in the local markets in 2010. In Jordan, the petroleum products prices raised to new levels to be effective from November 26, 2010 as follows:

product	Price
Regular Gasoline	600
Premium Gasoline	730
Diesel	515
Kerosene	515
Fuel Oil Industry (JD/Ton)	381.83
Fuel Oil – Bunkers (JD/Ton)	381.83
Jet Fuel –Local Companies	483
Jet Fuel – Foreign Companies	488
Jet Fuel - Charter Flights	503
Diesel – Bunkers	515
Asphalt (JD/Ton)	410.1
LPG – 12.5 kg (JD/Cylinder)	6.5
LPG – Bulk (JD/Ton)	816

Source: Ministry of Energy and Mineral Resources.
JD1=$1.41.

Table (1-25) shows domestic prices in OAPEC member countries in local currencies in 2010.

TABLES
OF CHAPTER ONE

Table 1-1
Total & Annual Changes in World Oil and NGLs Supply, 2006 - 2010
(Million b/d)

	2006	2007	2008	2009	2010*
Total Supply					
OPEC	34.5	34.1	35.3	33.0	34.0
Rest of the World	49.9	50.5	50.4	51.1	52.2
World total	**84.4**	**84.6**	**85.7**	**84.1**	**86.2**
Annual Change					
OPEC	(0.1)	(0.4)	1.2	(2.3)	1.0
Rest of the World	0.3	0.6	(0.1)	0.7	1.1
World total	**0.2**	**0.2**	**1.1**	**(1.6)**	**2.1**
(%) Percentage Change					
OPEC	(0.3)	(1.2)	3.5	(6.5)	3.0
Rest of the World	0.6	1.2	(0.2)	1.4	2.2
World total	**2.0**	**0.2**	**1.3**	**(1.9)**	**2.5**

* Estimated data.

Notes:
- Parentheses denote negative figures.
- OPEC's supply includes data from both Angola and Ecuador, which were admitted to OPEC as a full member at the beginning and the end of year 2007 respectively.

Sources:
- IEA, Oil Market Report (various issues).
- OAPEC - Economics Department.
- OPEC, Monthly Oil Market Report (various issues).

Table 1-2
Growth in the World Economy and Oil Demand by Region, 2006-2010
(%)

	2006	2007	2008	2009	2010*
OECD countries **					
GDP	3.0	2.7	0.2	(3.2)	2.8
Oil demand	(0.6)	(0.4)	(3.6)	(4.4)	1.1
Rest of the World					
GDP	8.2	8.7	6.0	2.5	7.1
Oil demand	4.4	3.9	3.7	1.7	2.8
World total					
GDP	5.2	5.3	2.8	(0.6)	4.5
Oil demand	1.3	1.4	(0.6)	(1.6)	1.9

* Estimated data.
** Include the newly industrialized Asian countries are Hong Kong, South Korea, Singapore, and Taiwan in terms of GDP.

Note:
Parentheses denote negative figures.

Sources:
- IEA, Oil Market Report (various issues).
- IMF, World Economic Outlook (various issues) .
- OAPEC - Economics Department.
- OPEC, Monthly Oil Market Report (various issues).

Table 1-3
World Economic Growth, 2006-2010
(%)

	2006	2007	2008	2009	2010*
OECD	3.0	2.7	0.2	(3.2)	2.8
Of which: Euro Area	3.0	2.9	0.5	(4.1)	1.5
Japan	2.0	2.4	(1.2)	(5.2)	4.3
Newly industrialized Asian countries	5.8	5.8	1.8	(0.9)	7.8
USA	2.7	1.9	0.0	(2.6)	2.8
Rest of the World :	8.2	8.7	6.0	2.5	(6.7)
Eastern and Central Europe	6.5	5.5	3.0	(3.6)	3.7
Countries in transition (CIS)	8.8	9.0	5.3	(6.5)	4.3
Of which: Russia	8.2	8.5	5.2	(7.9)	4.0
Asian developing countries	10.4	11.4	7.7	6.9	9.4
Of which: China	12.7	14.2	9.6	9.1	9.7
India	9.7	9.9	6.4	5.7	8.5
Latin America and the Caribbean	5.6	5.7	4.3	(1.7)	5.7
Of which: Argentina	8.5	8.7	6.8	0.9	7.5
Brazil	4.0	6.1	5.1	(0.2)	7.5
Mexico	4.9	3.3	1.5	(6.5)	5.0
Venezuela	9.9	8.2	4.8	(3.3)	(1.3)
Middle East and North Africa	5.8	6.0	5.0	2.0	4.1
Sub-Saharan African countries	6.4	7.0	5.5	2.6	5.0
World	5.1	5.2	3.0	(1.1)	(1.1)

* Estimated data.
** Includes all of Hong Kong, South Korea, Singapore and Taiwan.

Note:
Parentheses denote negative figures.

Source:
- IMF, World Economic Outlook, October 2010.

Table 1-4
Total & Annual Change in World Oil Demand, 2006-2010
(Million b/d)

	2006	2007	2008	2009	2010*
World total demand	**85.2**	**86.4**	**85.9**	**84.5**	**86.1**
Annual Change in World Oil Demand (Million b/d)	1.1	1.2	(0.5)	(1.4)	1.6
Change (%)	1.3	1.4	(0.6)	(1.6)	1.9

* Preliminary data.

Note:
Parentheses denote negative figures.

Sources:
- IEA, Oil Market Report (various issues).
- OAPEC - Economics Department.
- OPEC, Monthly Oil Market Report (various issues).

Table 1-5
World Oil Demand by Region, 2006-2010
(Million b/d)

	2006	2007	2008	2009	2010*
OECD countries	49.6	49.4	47.6	45.5	46.0
Rest of the World**	35.6	37.0	38.4	39.0	40.1
World total	85.2	86.4	85.9	84.5	86.1

* Estimated data.
** Includes all of the developing countries and transition countries.

Sources:
- IEA, Oil Market Report (various issues).
- OAPEC - Economics Department.
- OPEC, Monthly Oil Market Report (various issues).

Table 1-6
Total & Annual Change in Oil Demand in OECD Countries, 2006-2010
(Million b/d)

	2006	2007	2008	2009	2010*
North America	25.4	25.5	24.2	23.3	23.8
Western Europe	15.7	15.5	15.4	14.5	14.4
Pacific	8.5	8.4	8.0	7.7	7.8
Total OECD	**49.6**	**49.4**	**47.6**	**45.5**	**46.0**
Annual Change in demand	**(0.3)**	**(0.2)**	**(1.8)**	**(2.1)**	**0.5**
Change (%)	**(0.6)**	**(0.4)**	**(3.6)**	**(4.4)**	**1.1**

* Estimated data.

Note:
Parentheses denote negative figures.

Sources:
- IEA, Oil Market Report (various issues).
- OAPEC - Economics Department.
- OPEC, Monthly Oil Market Report (various issues).

Table 1-7
Total & Annual Change in Rest of the World Oil Demand (Excluding Countries that joined the OECD), 2006-2010 (Million b/d)

	2006	2007	2008	2009	2010*
Developing countries	**30.7**	**32.2**	**33.5**	**34.3**	**35.4**
Arab countries	**4.7**	**5.0**	**5.4**	**5.6**	**5.7**
Of which: Member countries	4.0	4.3	4.7	4.8	4.9
Other Arab countries	0.7	0.7	0.7	0.8	0.8
Other countries in the Middle East and Africa	4.5	4.6	4.7	4.7	4.8
Total Middle East and Africa	**9.2**	**9.6**	**10.1**	**10.3**	**10.5**
Asian developing countries	**16.2**	**17.1**	**17.4**	**18.1**	**18.7**
Of which: China	7.2	7.6	8.0	8.3	8.8
India	2.6	3.0	3.1	3.2	3.2
Other countries	6.4	6.5	6.3	6.6	6.7
Latin America	**5.3**	**5.5**	**6.0**	**5.9**	**6.2**
Of which: Brazil	2.2	2.3	2.5	2.5	2.5
Other countries	3.1	3.2	3.5	3.4	3.7
Countries in transition (CIS)	**4.9**	**4.8**	**4.9**	**4.7**	**4.7**
Of which: Russia	4.0	4.0	4.1	4.0	4.0
Total Rest of the World	**35.6**	**37.0**	**38.4**	**39.0**	**40.1**
Annual Change in demand of Rest of the World	**1.5**	**1.4**	**1.4**	**0.7**	**1.1**
Change (%)	**4.4**	**3.9**	**3.7**	**1.7**	**2.8**

* Estimated data.

Sources:
- IEA, Oil Market Report (various issues).
- OAPEC - Economics Department.
- OPEC, Monthly Oil Market Report (various issues).

Table 1-8
Spot Price of OPEC Basket of Crudes, 2006-2010
($/barrel)

	2006	2007	2008	2009	2010
January	58.5	50.7	88.4	41.5	76.0
February	56.6	54.5	90.6	41.4	73.0
March	57.9	58.5	99.0	45.8	77.2
April	64.4	63.6	105.2	50.2	82.3
May	65.1	64.5	119.4	57.0	74.5
June	64.6	66.9	128.3	68.4	73.0
July	68.9	71.9	131.2	64.6	72.5
August	68.8	68.7	112.4	71.4	74.2
September	59.3	74.2	96.9	67.2	74.6
October	55.0	79.3	69.2	72.7	79.9
November	55.4	88.8	49.8	76.3	82.8
December	57.9	87.1	38.6	74.0	88.6
First quarter	57.7	54.6	92.7	42.9	75.4
Second quarter	64.7	65.0	117.6	58.5	76.6
Third quarter	65.7	71.6	113.5	67.7	73.8
Fourth quarter	56.1	85.1	52.5	74.3	83.8
Annual average	**61.0**	**69.1**	**94.4**	**61.0**	**77.4**

Sources:

- OAPEC - Economics Department.
- OPEC, Monthly Oil Market Report (various issues).

Table 1-9
Average Spot Prices of the OPEC Basket,Brent,WTI and Selected Arab Crudes, 2006-2010
($/barrel)

Crudes	2006	2007	2008	2009	2010	The increase in 2010
OPEC Basket Of which:	61.1	69.1	94.4	61.0	77.4	16.4
Algeria - Saharan Blend	66.1	74.7	98.9	62.4	80.4	18.0
Arabian Light	61.1	68.8	95.2	61.4	77.8	16.4
UAE - Murban	66.1	72.9	99.0	63.8	79.9	16.1
Kuwait - Export	58.9	66.4	91.2	60.7	76.3	15.6
Libya - Es Sider	63.4	71.4	96.7	61.5	79.1	17.6
Qatar-Marine	62.6	69.3	94.9	62.4	78.2	15.8
Iraq-Basrah	58.0	66.4	92.1	60.5	76.8	16.3
Other crudes						
Brent	65.2	72.6	97.4	61.7	79.6	17.9
UAE - Dubai	61.5	68.4	93.8	61.8	78.1	16.3
WTI	66.0	72.3	100.0	61.9	79.4	17.5

Sources:
- OAPEC - Economics Department.
- OPEC, Monthly Oil Market Report (various issues).

Table 1-10
Nominal and Real Prices of Crude Oil, 1995-2010
($/barrel)

	Nominal Price	Index* 1995=100	Real 1995 Prices
1995	16.9	100.0	16.9
1996	20.3	101.9	19.9
1997	18.7	103.6	18.0
1998	12.3	105.0	11.7
1999	17.5	105.9	16.5
2000	27.6	107.5	25.7
2001	23.1	109.5	21.1
2002	24.3	111.3	21.8
2003	28.2	113.3	24.9
2004	36.0	115.6	31.1
2005	50.6	118.0	42.9
2006	61.0	120.6	50.6
2007	69.1	123.4	56.0
2008	94.4	125.8	75.0
2009	61.0	126.7	48.1
2010**	77.4	128.1	60.4

* The index represents the GDP Deflator of industrial countries as published by the IMF.
** Estimated data.

Sources:
-IMF, International Financial Statistics Yearbook , September 2010.
- OAPEC - Economics Department.
- OPEC, Monthly Oil Market Report (various issues).

Table 1-11
Average Monthly Market Spot Prices of Petroleum Products, 2009-2010
($/barrel)

	Market	Unleaded Gasoline	Gasoil* (0.2 % Sulfur)	Fuel Oil** (3 % Sulfur)
Average 2009	Singapore	69.3	70.5	57.2
	Rotterdam	65.6	69.5	54.3
	Mediterranean	56.8	76.5	55.5
	US Gulf	72.9	67.2	57.6
Average 2010	Singapore	88.4	90.9	73.0
	Rotterdam	90.0	90.4	72.0
	Mediterranean	80.5	89.4	71.5
	US Gulf	91.5	88.1	71.8
First quarter 2010	Singapore	88.4	85.9	73.5
	Rotterdam	80.3	84.8	71.9
	Mediterranean	67.1	83.6	71.4
	US Gulf	88.3	83.1	70.7
Second quarter	Singapore	87.5	90.8	72.1
	Rotterdam	91.5	88.9	70.8
	Mediterranean	69.9	87.0	70.4
	US Gulf	94.1	87.3	70.3
Third quarter	Singapore	82.5	87.6	70.4
	Rotterdam	89.3	88.1	71.3
	Mediterranean	83.3	87.7	69.9
	US Gulf	86.9	84.8	69.3
Fourth quarter	Singapore	95.0	99.3	75.8
	Rotterdam	98.8	99.9	74.1
	Mediterranean	101.5	99.4	74.4
	US Gulf	96.6	97.1	76.7

* Singapore gasoil contains 0.5 % sulfur.
** Rotterdam fuel oil contains 3.5 % sulfur.

Source:
OPEC, Monthly Oil Market Report (various issues).

Table 1-12
Share of Tax in Gasoline Prices in some OECD countries, 2009-2010
($/liter)

	October 2009				October 2010			
	Price without Tax	Tax	End-User Price	Tax (%)	Price without Tax	Tax	End-User Price	Tax (%)
Canada	0.60	0.30	0.90	33.33	0.71	0.32	1.03	31.20
France	0.61	1.21	1.82	66.48	0.71	1.15	1.86	61.71
Germany	0.63	1.28	1.91	67.02	0.69	1.21	1.90	63.69
Italy	0.71	1.15	1.86	61.83	0.78	1.10	1.88	58.37
Japan	0.72	0.68	1.40	48.57	0.85	0.76	1.61	47.09
Spain	0.68	0.86	1.54	55.84	0.76	0.86	1.62	53.06
United Kingdom	0.56	1.13	1.69	66.86	0.66	1.20	1.86	64.65
USA	0.56	0.11	0.67	15.79	0.63	0.11	0.74	14.71

Source:
- IEA, Oil Market Report (various issues).

Table 1-13
Spot Tanker Freight Rates, 2009 - 2010
(World scale)

	Arabian Gulf - East *	Arabian Gulf -West **	Mediterranean - Mediterranean ***
Average 2009	42	31	83
January 2009	58	41	106
February	47	39	88
March	40	33	71
April	30	22	62
May	29	22	68
June	46	33	111
July	37	28	64
August	38	27	67
September	34	26	70
October	42	29	84
November	47	32	92
December	57	38	113
Average 2010	73	51	117
January 2010	108	68	123
February	83	57	95
March	82	58	137
April	94	66	114
May	76	56	174
June	96	63	112
July	58	45	110
August	52	41	108
September	47	36	87
October	46	34	117
November	69	45	94
December	60	40	133

* Vessels of 230-280 dwt.
** Vessels of 270-285 dwt.
*** Vessels of 80-85 dwt.

Source:
- OPEC, Monthly Oil Market Report (various issues).

Table 1-14
OECD Oil Inventories at Quarter End, 2009 & 2010
(Million barrel)

	First quarter		Second quarter		Third quarter		Fourth quarter	
	2009	2010	2009	2010	2009	2010	2009	2010*
North America	**1348**	**1315**	**1383**	**1372**	**1390**	**1396**	**1309**	**1330**
Of which: USA	1080	1082	1071	1089	1060	1087	1052	1067
Europe	985	992	970	992	968	951	972	980
Pacific	408	383	401	397	419	403	383	395
Total OECD	**2741**	**2690**	**2754**	**2761**	**2777**	**2750**	**2664**	**2705**
Rest of the World	1415	1512	1432	1492	1426	1492	1449	1548
Other Inventories**	1030	1055	1061	1054	1058	1085	1078	1031
Total Commercial	**5186**	**5257**	**5247**	**5307**	**5261**	**5327**	**5191**	**5284**
Strategic :	**1711**	**1765**	**1734**	**1773**	**1746**	**1763**	**1756**	**1763**
US Strategic Petroleum Reserves	713	727	724	727	725	726	727	726.5
Usable Commercial***	1334	1406	1395	1487	1411	1475	1340	1432
OECD Commercial (days supply)	61.6	60.6	61.0	61.0	60.5	59.0	58.0	59.7
Total Commercial (days supply)	72.3	72.7	72.8	72.9	72.3	71.5	71.1	71.0
OECD Strategic (days supply)	35		35		34.5		34	
Usable Commercial (days supply)	18.6	19.3	19.6	18.5	19.3	19.7	18.8	19.6

* Estimated data.
** Oil At Sea and Independent storage.
*** Stock holding over the above minimum operating needs (55 days).

Sources:
- OAPEC - Economics Department
- EIG Inc., Oil Market Intelligence (various issues).

Table 1-15
Value of Oil Exports in OAPEC Member Countries, 2006-2010
($ Million)

	2006	2007	2008	2009*	2010*
Algeria	25492	27757	38543	21497	28089
Bahrain	5923	7106	5895	3275	4664
Egypt***	3214	3128	4911	2166	2593
Iraq	31585	38056	63000	43895	54248
Kuwait	36642	38488	57690	41858	53029
Libya	34110	36944	52084	29446	38764
Qatar	17685	18741	27428	16172	20553
Saudi Arabia	162002	178284	247097	144249	184421
Syria	5219	5644	7989	5414	6689
Tunisia	**	**	**	**	**
UAE	53222	56025	80635	44785	57900
Total	375094	410173	585272	352757	450950

* Estimated data.
** Preliminary data indicate that oil consumption exceeds oil production.
*** Official sources for 2007 & 2008.

Sources:
- OAPEC - Economics Department.
- OPEC, Monthly Oil Market Report (various issues).

Table 1-16
Value of OAPEC Oil Exports in Current and Real Prices, 1995-2010
($ Billion)

Year	At Current Prices	Expressed in Real 1995 Prices
1995	93.7	93.7
1996	108.7	106.9
1997	110.0	106.2
1998	76.8	73.1
1999	109.7	103.6
2000	177.2	164.8
2001	148.6	135.7
2002	142.0	127.6
2003	159.5	140.8
2004	219.0	189.4
2005	305.8	259.2
2006	375.1	311.0
2007	410.2	332.4
2008	585.3	465.0
2009*	352.8	278.3
2010*	450.9	352.0

* Estimated data.

Note: Real revenues are obtained by deflating current prices by the GDP Deflator of industrial countries as published by the IMF.

Source:

- OAPEC - Economics Department.

Table 1-17
Energy Consumption in the Arab Countries, 2006-2010
(Thousand boe/d)

	2006	2007	2008	2009	2010(1)
Petroleum products *					
Member countries	4015	4314	4646	4808	4957
Other Arab countries	667	696	729	750	767
Total Arab countries	**4681**	**5010**	**5375**	**5558**	**5724**
Natural gas					
Member countries	3811	3963	4413	4594	4729
Other Arab countries	148	159	168	174	179
Total Arab countries	**3959**	**4122**	**4581**	**4768**	**4908**
Hydroelectricity					
Member countries	100	99	107	107	107
Other Arab countries	34	34	34	34	34
Total Arab countries	**134**	**133**	**141**	**141**	**142**
Coal					
Member countries	23	34	34	34	34
Other Arab countries	13	13	13	13	13
Total Arab countries	**36**	**47**	**46**	**47**	**47**
Total Energy					
Member countries	7949	8409	9199	9544	9828
Other Arab countries	861	902	944	971	993
Total Arab countries	**8810**	**9311**	**10143**	**10515**	**10821**

* Petroleum products include crude oil used in power plants.
- (1) Estimated data.
Note : The total may not add up due to rounding.

Sources:
- Country papers presented to the Ninth Arab Energy Conference, Doha, Qatar, 9 - 12 May, 2010.
- OAPEC - Economics Department.

Table 1-18
Per Capita Energy Consumption in the Arab Countries, 2006 and 2010
(Boe/year)

	2006	2010*
Algeria	6.0	6.6
Bahrain	103.7	90.5
Egypt	6.1	6.6
Iraq	6.5	7.9
Kuwait	52.2	48.6
Libya	22.9	24.2
Qatar	177.6	134.6
Saudi Arabia	37.8	42.2
Syria	7.1	7.6
Tunisia	5.4	6.0
UAE	93.1	101.6
OAPEC member countries	**14.3**	**16.1**
Other Arab countries	**2.8**	**2.9**
Total Arab countries	**10.2**	**11.4**

* Estimated data.

Sources:
- Country papers presented to the Ninth Arab Energy Conference, Doha, Qatar, 9 - 12 May, 2010.
- OAPEC - Economics Department.

Table 1-19
Energy Consumption in OAPEC Member Countries, 2006-2010
(Thousand boe/d)

	2006	2007	2008	2009	2010(1)
Algeria	551	576	605	625	645
Bahrain	273	277	292	306	318
Egypt	1192	1255	1317	1358	1398
Iraq	513	494	600	678	700
Kuwait *	437	457	482	498	515
Libya	429	443	471	497	513
Qatar	507	546	594	634	660
Saudi Arabia *	2455	2625	2845	2920	3000
Syria	364	438	428	413	428
Tunisia	150	157	163	167	172
UAE	1079	1140	1402	1447	1478
Total	**7949**	**8409**	**9199**	**9544**	**9828**

* Including energy consumption in the oil industry .
- (1) Estimated data.
Note : The total may not add up due to rounding.

Sources:
- Country papers presented to the Ninth Arab Energy Conference, Doha, Qatar, 9 - 12 May, 2010.
- OAPEC - Economics Department.

Table 1-20
Energy Consumption in OAPEC Member Countries by Source, 2006-2010
(Thousand boe/d)

	2006	2007	2008	2009	2010(1)
Petroleum products*	4015	4314	4646	4808	4957
Natural gas	3811	3963	4413	4594	4729
Hydroelectricity	100	99	107	107	108
Coal	23	34	34	34	34
Total energy	**7949**	**8409**	**9199**	**9544**	**9828**

* Including Oil consumption of the power plants in some OAPEC member countries.
- (1) Estimated data.
Note : The total may not add up due to rounding.

Sources:
- Country papers presented to the Ninth Arab Energy Conference, Doha, Qatar, 9 - 12 May, 2010.
- OAPEC - Economics Department.

Table 1-21
Petroleum Products Consumption in OAPEC Member Countries, 2006-2010
(Thousand boe/d)

	2006	2007	2008	2009	2010(1)
Algeria	253	273	310	320	330
Bahrain	37	37	42	46	48
Egypt	598	635	659	680	700
Iraq **	371	346	418	482	500
Kuwait *	377	396	414	428	440
Libya	201	203	221	237	243
Qatar	57	66	84	94	100
Saudi Arabia *	1449	1584	1718	1770	1820
Syria	274	351	341	295	306
Tunisia	100	104	108	110	112
UAE	297	320	331	347	358
Total	**4015**	**4314**	**4646**	**4808**	**4957**

* Figures include energy consumption of the oil sector and power plants.
** Figures include energy consumption of the power plants.
- (1) Estimated data.
Note : The total may not add up due to rounding.

Sources:
- Country papers presented to the Ninth Arab Energy Conference, Doha, Qatar, 9 - 12 May, 2010.
- OAPEC - Economics Department.

Table 1-22
Natural Gas Consumption in OAPEC Member Countries, 2006-2010
(Thousand boe/d)

	2006	2007	2008	2009	2010(1)
Algeria	275	288	280	290	300
Bahrain	236	240	250	260	270
Egypt	520	530	560	580	600
Iraq	122	129	162	177	180
Kuwait	59	61	68	70	75
Libya	228	240	250	260	270
Qatar	450	480	510	540	560
Saudi Arabia	1006	1041	1127	1150	1180
Syria	83	80	80	111	115
Tunisia	50	53	55	57	59
UAE	782	820	1071	1100	1120
Total	**3811**	**3963**	**4413**	**4594**	**4729**

- (1) Estimated data.

Note : The total may not add up due to rounding.

Sources:

- Country papers presented to the Ninth Arab Energy Conference, Doha, Qatar, 9 - 12 May, 2010.
- OAPEC - Economics Department.

Table 1-23
Hydroelectricity Consumption in OAPEC Member Countries, 2006-2010
(Thousand boe/d)

	2006	2007	2008	2009	2010*
Algeria	8.0	1.0	1.3	1.3	1.3
Egypt	65.0	70.5	78.4	78.4	78.4
Iraq	20.0	20.0	20.0	20.0	20.0
Syria	7.1	7.1	7.1	7.1	7.1
Tunisia	0.2	0.2	0.2	0.2	0.2
Total	**100.3**	**98.8**	**107.0**	**107.0**	**107.0**

* Estimated data.

Sources:
- Country papers presented to the Ninth Arab Energy Conference, Doha, Qatar, 9 - 12 May, 2010.
- OAPEC - Economics Department.

Table 1-24
Coal Consumption in OAPEC Member Countries, 2006-2010
(Thousand boe/d)

	2006	2007	2008	2009	2010*
Algeria	15.1	13.8	13.4	14.0	14.0
Egypt	8.2	20.1	20.1	20.1	20.1
Total	23.3	33.9	33.5	34.1	34.1

* Estimated data.

Sources:
- Country papers presented to the Ninth Arab Energy Conference, Doha, Qatar, 9 - 12 May, 2010.
- OAPEC - Economics Department.

Table 1-25
Domestic Prices of Petroleum Products in OAPEC Member Countries, 2010
(Local curvrency/liter)

	Currency	Gasoline		Household	Gas oil/	LPG
		Premium	Regular	Kerosene	Diesel	
Algeria	Dinar	22.6	21.2	-	13.7	9.0
Bahrain	Fils	100.0	80.0	25.0	100.0	100*
Egypt	Piaster	130.0	90.0	75.0	75.0	250**
Iraq	Dinar	450.0	-	150.0	400.0	4000**
Kuwait	Fils	65.0	60.0	55.0	55.0	750**
Libya	Dirham	180.0	-	80.0	170.0	54.0
Qatar	Riyal	0.8	0.7	-	0.7	15.0
Saudi Arabia	Halala	60.0	45.0	44.0	25.0	45.0
Syria	Lira	40.0	-	40.0	20.0	250**
Tunisia	Millime	998.0	998.0	180.0	357.0	158.0
UAE	Dirham	1.8	1.5	2.5	2.1	-

* Per kilogram.
** Per cylinder.

Sources:
- Country papers presented to the ninth Arab Energy Conference, Doha, Qatar, 9 - 12 May, 2010.
- OAPEC - Economics Department.

CHAPTER TWO
ARAB AND WORLD DEVELOPMENTS IN THE EXPLORATION, RESERVES AND PRODUCTION OF ENERGY RESOURCES

I. OIL AND GAS

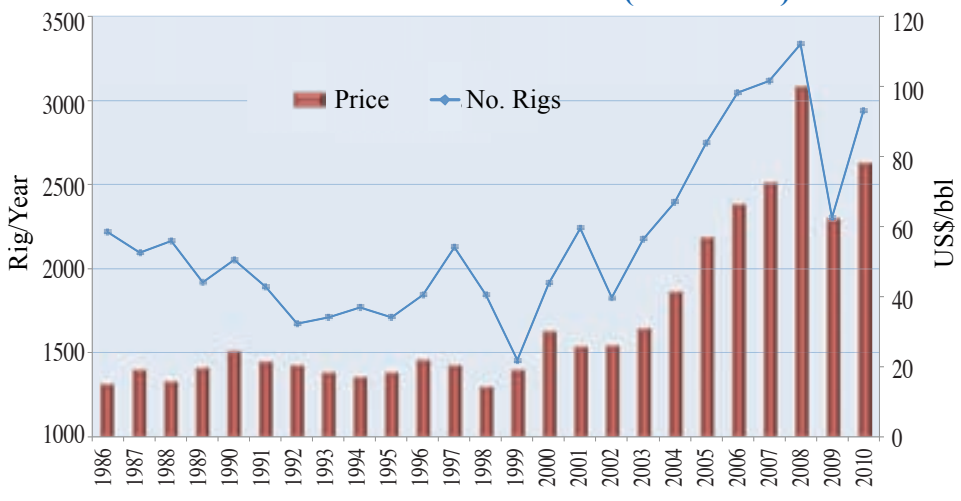
1. Exploration and Production: An Overview

A. Financial Developments in Support of Exploration & Development

The easing signs of the financial crisis that swept the world in 2008/2009, along with relatively stable oil prices, have jointly contributed to the recovery of exploration activities around the world. This was clearly reflected in the increasing number of active rigs in many regions comparing with the remarkable decline witnessed between 2008/2009 (Chart A), yet the number is still below 2008 average.

Chart A,

Changes of the Average Number of Active Rigs Worldwide, in Relation to Fluctuated Oil Prices (1986- 2010)*



* Figures of 2010 are up to November.

A report produced by Wood Mackenzie, published in November 2010, stated that confidence has returned to many regions and sectors of the upstream industry, nevertheless, revival was not uniform.

The report estimated that total upstream spending will recover to around $ 380 billion in 2010, compared with $ 361 billion in 2009, but still 10% lower than the formerly high levels of 2008. This recovery is expected to continue over the next three years and global spending could recover to 2008 levels by 2012 or 2013. The report indicated that the upstream investments in Iraq are expected to reach $ 10 billion within the next three years.

President of Saudi Aramco declared that the company has spent over $ 62 billion between 2005 and 2010 to increase oil production capacity to an average of 12 million b/d, he estimated the company to invest another $ 90 billion until 2015, of which a reasonable share will be earmarked to gas sector. Moreover, he indicated that current and future capital investments in joint projects of refining and marketing will add another $ 80 billion within that span of time. Saudi Aramco has announced plans to drill as many as 48 new exploration wells and a further 300 development wells in 2010, besides, number of drilling rigs was decided to stay at 96 rigs, 17 of which were dedicated to exploration activities, the rest worked on development wells, 50% of Aramco's drilling program in 2010 has targeted natural gas. On the other hand, Saudi Aramco let contracts worth nearly $ 500 million to GE Energy for acquiring equipments to expand Shaybah field's oil production and natural gas-processing capacities. The expansion is expected to boost crude oil production capacity to 1 million b/d compared with Shaybah's current capacity of 750,000 b/d. Shaybah, lies in southeastern Saudi

Arabia, has undergone various expansions. An upgrade completed in June 2009 boosted its crude capacity from 500,000 b/d to its current level. Aramco also is working on boosting its natural gas capacity at Shaybah by building an NGL plant to process 2.4 billion scfd of low-sulfur sweet gas and extract 264,000 b/d of NGL.

Reference can be made to Oman that plans to invest $ 3.5 billion in the coming five years in an effort to boost the country's oil production by 18%, targeting an average of 1 million b/d by 2015.

The report of Wood Mackenzie noted that USA is going to lead the upstream investments rebound, where total spend should return close to peak levels by 2011, spending could exceed $ 11 billion in 2013, from about $ 3 billion in 2009. On the other hand, Canada and Russia, were much severely affected by the global crisis, and have experienced a modest recovery, upstream spending was reduced by around 30% through 2009, but current plans anticipate that investments will not return to 2008 levels until towards 2020.

National Iranian Oil Company (NIOC) has declared that it needs an annual investments of $ 24- 30 billion to achieve its development plans between 2010 and 2030. It stated that 13% of its annual returns will be deployed in oil industry, while 17% will be paid as a governmental tax. The company assured that available financing is 50% less than considered necessary; pointing out that priority will be to improve the oil recovery factor that declined to 27% within the last five years, and to develop 12 fields some of which extend to neighboring countries.

Some companies budgets increased remarkably comparing with the last few years, Chevron Corp. for example plans a $ 26 billion capital

spending budget for 2011, of which $ 22.6 billion is targeted towards oil and gas exploration and production projects worldwide with $ 5.4 billion going to USA projects and $ 17.2 billion going to projects elsewhere. For 2010, Chevron had a $ 21.6 billion capital and exploration spending program. The company plans to spend $ 4 billion to produce crude and natural gas from its Big Foot discovery in the USA Gulf of Mexico. The field, with reserves of 200 million barrels of oil equivalent, is scheduled to come online in 2014, it will be capable of producing 75,000 b/d of oil and 25 million scfd of gas (about 700,000 m^3/d)[1] .

B. Developments in the Arab Countries

Petroleum industry in Arab countries has witnessed an active movement in 2010, which can be considered as a continuation of the recovery that began in late 2009, for example:

In the United Arab Emirates, Dana Gas has completed early work on a 25-year oil and gas concession offshore Sharjah, awarded in March 2008. The concession, the company's first offshore upstream asset, covers over 1000 sq km and includes part of the Zora gas field, which has proven gas reserves and a ready market. The projects' initial phase includes upstream development and transportation of produced gas and condensates via a 25 km offshore pipeline. Detailed engineering has been completed for the offshore platform, as has conceptual engineering design for the onshore gas processing plant. Dana Gas is preparing to award management, engineering, procurement, construction, and installation contracts. The agreement also provides for important exploration works within the concession area, including geological

1 Oil and Gs Journal, 9/12/2010

evaluation studies, followed by seismic surveys and the drilling of exploration wells. The preliminary costs of the development phase of the project are estimated at $ 55 million, while the exploration works are estimated at a further $ 65 million. Moreover, the UAE's Crescent Petroleum and Rosneft, the biggest Russian oil producer, have started drilling the first exploration well under an onshore concession covering the emirate of Sharjah. Crescent Petroleum has formed a venture with Rosneft to develop the concession, which the government of Sharjah awarded to the local company in 2008. The Russian company has chosen the Sharjah on-shore concession called Al Madam- Al Ned, as its first international investment in the Middle East, the president of the company assured that there plans to drill two more exploration wells, pointing out that the recoverable reserves in the concession are estimated at 67.6 billion m^3 of gas, and 16 million ton if NGL, but more reserves are expected according to him. Crescent and Rosneft will initially spend $ 59.8 million to drill two wells to a depth of about 4500 m.

By late 2010, ExxonMobil Corp. said two pilot wells have demonstrated feasibility of plans to expand development of supergiant Upper Zakum oil field off Abu Dhabi with extended-reach drilling from artificial islands. The technology is analogous to methods the company and partners are using at the Sakhalin-1 project in northeastern Russia. ExxonMobil holds a 28% interest in Zakum Development Co. (Zadco), operator of Upper Zakum field, which holds an estimated 50 billion bbl of oil. National Marines Company is building four artificial islands in 4- 24 m of water in a project designed to raise Upper Zakum production by nearly 40% to 750,000 b/d. The cost of the field development project is estimated at $ 15 billion, Zadco is planning to use the artificial islands

for the constructing of drilling and infrastructure development sites, this could save 20-30% of the cost comparing with traditional methods. Upper Zakum is located 84 km to the north west of Abu Dhabi, it is considered as the largest field in UAE, the second largest field in the Arab Gulf region and the fourth largest field in the world, it covers an area of about 1200 sq km. Crude oil from Upper Zakum field is pumped via main oil lines to Zirku Island for further processing, storage and export. National Petroleum Construction Company has won a Dh 1 million (around $ 270 million) contract in 2010, for the construction, installation and maintenance of a 60- km, 42 inch pipeline, with 1 million b/d capacity, the pipeline extends from Upper Zakum to Zirku island.

RAK Petroleum PCL signed an agreement with Ras Al Khaimah Gas Commission to take a 100% stake and operatorship of Saleh field in the Gulf off Ras Al Khaimah in exchange for 100 million shares in RAK Education Co.

As part of the agreement, Ras Al Khaimah Gas Commission is being offered a back-in right, exercisable during a 3-month window following completion of the first Saleh well, for a 30% participation upon payment of 30% of well costs. Saleh Field was discovered in 1964 by the United Petroleum Company.

In the Kingdom of Bahrain, the first meeting of the management committee of Bahrain Field Development Company (the main supervisory committee) held its first meeting early in 2010, the meeting witnessed the discussion of Tatweer Petroleum Company agenda, and the operation budget of 2010, its program included the drilling of 17 oil wells, and further 4 new wells targeting the gas in Al Khuff formation.

The committee approved the strategic plan for the next five years which includes the drilling of more than 600 new wells, construction projects to expand the oil and water facilities and gas production capacity, and upgrading the facilities to meet the prospected increase in oil production as development operations are expected to boost the oil production rate to more than 70,000 b/d. the necessary investments in the next five years are projected at more than $ 1.6 billion.

In Tunisia, Gulfsands Petroleum has acquired the Kerkouane permit offshore Tunisia and the G.R15.PU exploration permit in southern Italy. The two permits are contiguous and collectively cover 4500 sq km. The permits contain multiple prospects and leads including the Lambouka prospect, a large horst block containing multiple reservoir targets. Lambouka lies in approximately 400 m of water and has mean estimated reserves of 270 million boe[2], Gulfsands expects to spud a well on the Kerkouane permit using the semi submersible Atwood Southern Cross. In the 3rd quarter of 2010, Gulfsands, announced that is has provided the results of an internal study, the 'Lambouka Preliminary Volumetric Resource Estimates' which was undertaken to provide a preliminary volumetric estimate of the potential hydrocarbon resource associated with the Lambouka gas discovery. This estimate incorporates information from a newly acquired 3D seismic data as well as drilling and petrophysical log data from the Lambouka-1 well. Gas Resources were estimated at 309 billion cubic feet, and 24 million barrels of condensate.

In Algeria, Russian Gazprom EP International started the prospecting and exploration activities in El Aseel license in the 1st quarter of 2010,

2 Barrels of Oil Equivalent.

the company has commenced its 1st exploration well "Suhur Sayah-2" in the El Assel license area of Algeria's Berkine basin, the well is a part of the commitment with the Algerian State Oil and Gas Corp. as four wells are to be drilled in the onshore part of El Aseel license until 2012.

Petroceltic International plc, the operator of Isarene permit, has signed a contract for drilling rig services with Dalma Energy LLC, for a drilling program of four appraisal wells. This additional program is further to a successful five well drilling program undertaken in 2009/2010, which demonstrated the presence of an extensive and probably continuous gas accumulation. Petroceltic has begun appraisal drilling operations on the Isarene permit by late 2010, the AT-4 well on the Ain Tsila discovery was spudded in November 16. The field covered an area of over 1,000 sq km with current internal estimates for gas initially in place of 6-14 trillion cubic feet.

On the other hand, Algeria announced the achievement of an Algerian-Tunisian partnership project covering offshore oil exploration. It is planned to start in 2011 in the Tunisian coasts.

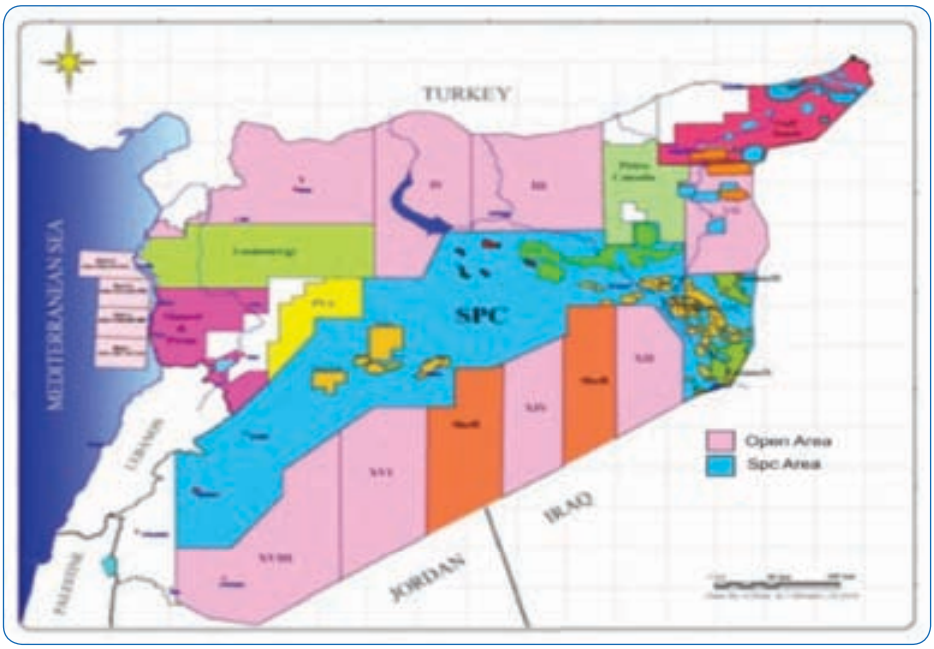
In Saudi Arabia, and in line with Saudi Armco's efforts to improve the production, the company has officially debuted its giga-cell reservoir simulation technology, GigaPOWERS™, which is the second generation of Saudi Aramco's leading reservoir simulator POWERS (Parallel Oil, Water and Gas Enhanced Reservoir Simulator), that is used to simulate fluid movement in the reservoir to optimize production and injection and the management of the reservoir. The new system -made available to all involved engineers- sets a new industry record of being able to simulate giant fields at seismic or near-seismic resolution,

thus doing away with the conventional industry practice of averaging the simulation model cells in order to reduce their number, which also reduces the amount of information in the model. It can simulate models in excess of 1 billion cells, it broke the 10- million cells record achieved previously.

In Syrian Arab Republic, the General Petroleum Corporation (GPC), announced that the prospecting activities indicate that the Syrian oil is not going to deplete in the near future, as there is a possibility to improve the recovery factor of the fields from their current levels. New onshore and offshore exploration activities will be launched soon, General Manager of GPC mentioned that infill drilling in AL Furat Petroleum Company fields showed some prospected areas, he added that international oil companies could boost the recovery factor to 40% in many fields. General Manager added that most of the new discoveries are expected to be gas ones. Ministry of Oil and Mineral Resources is planning to reach a production target of 240- 250 thousand b/d in 2025, the production will fulfill the current refineries demand (Home & Banias). However, the production will be mainly heavy crude which may require the import of light oil in the future. Aiming to intensifying the exploration activities, the Ministry of Oil and Mineral Resources and the General Petroleum Corporation announced -by the end of 1st quarter of 2010 - an international bid round for exploring and developing eight blocks that cover an area of about 73,000 sq km, bids should be based on production sharing contracts models (PSC), the blocks were 3, 4, 5, 7, 2, 14, 16 and 18. Twelve international companies of different nationalities have submitted their offers for the blocks illustrated in (Map-1).

Map1,

Open Blocks in Syria as of 2010 Bid Round



Croatian company Ena has commenced the drilling of Saib-1 exploration well in April 2010 in the northern part of block 10, located to the east of the city of Salamia 60 km to the north of Hama. Ena aims to explore the hydrocarbons in the sedimentary sequences particularly in the Korachina Dolomite formation, the wells drilled in the vicinity have revealed hydrocarbons shows. Saib-1 is planned to penetrate the whole sedimentary section down to the Paleozoic Era rocks at a depth of 2900 m.

It is worth mentioing that Ena is prospecting and exploring in Syria since 2004, it has another investment in Syria as a partner of the Syrian

Petroleum Company through Hayyan Oil Company which is undertaking the development operation of the oil and gas fields discovered by Ena in the Hayyan contract area (fields of Jehar, Plamyra, Al Muhr, Ghazal, Al Mustadeera and Mezrour). It also continues the prospecting operations in Hayya contract area which is located to the west of Palmyra city.

Production from Al Bou Kamal Petroleum Company's field (South Al Keshma) was started in the 1st half of 2010 at a rate of 1,000 b/d, the reserves in the field are estimated at 4.89 million tons. The company is working on developing the field by drilling more wells and building a production station as a part of its efforts to reach a production rate of 5,000 b/d in 2014. Al Bou Kamal Petroleum Company is an operating joint venture that was established between the General Petroleum Corporation and the Russian Tatneft Company according to the contract of oil exploration, developing and production.

Syria has also announced in the 3rd quarter of 2010 that the Ebla Petroleum Company (EBCO) has started its operations, its bylaw and organization structure were approved, and its plane for 2011 was discussed. The new company is a joint venture between General Petroleum Corporation on one side, and Petro- Canada- Palmyra Company on the other side, it is operating according to the contract of oil developing and production from Palmyra area (Tadmur), the company is supervising the Ebla gas plant which processes raw gas produced from the fields of Al Sha'er and Al Shareefah, its daily output is estimated at 2.3 million m^3/d of gas, 2150 b/d of condensate and 110 tons of LPG.

Dijla Petroleum Company which is a joint venture between General Petroleum Corporation and Gulfsands Company, has also started its

activities in the 3rd quarter of 2010, it started oil transportation from its fields to Tal Adas station via a new 22- km, 8 in pipeline, while transporting oil by tanks was stopped. Kherbet East oil field produces 18,000 b/d, and Al Yousfieah oil field produces 3,000 b/d. The company declared that it is undertaking 1025 sq km of 3D seismic survey for its fields, three exploration wells are scheduled in the next plan, one of which is a deep well designed to evaluate the Butma and Korachina formations.

In Iraq, efforts continued to renew the operation agreement of Kirkuk – Ceyhan pipeline to transport Iraqi oil, committees from both countries are finalizing the agreement which is expected to be for 20 years. The Iraqi side prefers that the agreement lasts for only 15 years. Kirkuk – Ceyhan pipeline links the north Iraq oil fields of Kirkuk to Turkey's Mediterranean Port Ceyhan. Kirkuk – Ceyhan pipeline is the largest oil export line crossing the Turkish territories with a designed capacity of 1.5 million b/d, nevertheless its usable capacity has never exceeded 250,000 b/d.

An initial agreement was achieved between Iraq and Syria to build a pipeline to the Mediterranean including one crude pipeline with a capacity of 1.5 million barrels per day and a second with 1.25 million bpd capacity, the Iraqi government said.

Government Spokesman said in a statement that the larger of the two oil pipelines would carry heavier crudes while the smaller would export light crudes. He added that a third pipeline foreseen in the possible project would be for gas which could be used to operate pumping stations, he assured that the Iraqi government has approved the plan. Iraq's Deputy Oil Minister has earlier announced that the Oil Ministry

intends to issue a tender for the pipeline project. The Iraqi government has signed a series of agreements with major international oil companies to quadruple its crude oil production capacity, these agreements are expected to raise Iraq's oil exports to 10 million b/d. Iraq is expected to have four oil export terminals by mid 2011 at an estimated cost of $ 500 million each, Khur Al Emayyah and Al Basra terminals are planned to be renewed. On the other hand, prospecting and exploration activities were increased in many areas of Iraq, Vast Exploration Inc. for example has announced that drilling activities were commenced in Kurdistan where the first exploration well spudded was Qara Dagh Well No.1. Drilling is approximately expected to take four to five months to complete and will target up to seven potential reservoirs in the Cretaceous, Jurassic and Triassic formations. The said company has- by mid 2009- acquired 354 km of 2D seismic in Qara Dagh block which area is 846 sq km.

Hungarian oil and gas group "MOL" announced that it has completed the testing of the first well "Bijell-1" in Akri-Bijell block in the Kurdistan Region of Iraq. The cased hole test performed at the depth of 3804 - 3967 m from Jurassic formations produced 2700 b/d of 12-13 °API oil through 40/64" choke. Earlier, the Bijell-1 well produced- in an open hole test- about 3200 b/d of 18 °API oil and 933,000 scfd of gas through 48/64" choke from a Jurassic formations at 3646 - 3831 m interval. Finally, a joint cased hole test was performed for the above two intervals as well, with a result of 3743 b/d of 13° API oil and more than 618,000 scfd of gas through 48/64" choke. The company assured that such results supported the field development plan.

Another example comes from WesternZagros Resources Ltd. Were the results of a cased-hole test of a Lower Oligocene formation at the

Kurdamir-1 exploratory well on the Kalar-Bawanoor block in southern Iraqi Kurdistan region, further confirmed the zone's world class nature. The well flowed at a maximum 18.3 million scfd of gas at 1960 psi flowing wellhead pressure with 86 barrels of 62° gravity condensate for each one million cubic feet of gas after acidizing. No formation water was recovered. A mixture of light crude oil and condensate was recovered during the test prior to acidizing. After acidizing the well, the company interpreted that the high gas rates and pressures prevented further oil flow. WesternZagros planned a further cased-hole test deeper in the Lower Oligocene to confirm the thickness of the oil leg below the gas-condensate. The company said that the test "further confirms the world class nature of the Oligocene reservoir which can exhibit high test rates even from its lower quality zones".

It must be stressed that developing activities are improving rapidly in the Iraqi fields especially after signing many agreements with different international companies. Norwegian StatOil for example concluded a 20- years deal at the beginning of 2010 to develop the second phase of West Al Qurna field to the south of Iraq, which reserves are about 12.9 billion barrel. StatOil assured that the production rate of the field will reach 120,000 b/d by 2012.

Among other efforts to increase gas production, Iraq has knocked down to bids for three gas fields which total reserves are estimated at about 11.2 trillion cubic feet (around 317 billion m^3), those are:

1. Akkas field, Kazmunaigaz Exploration Production and Korea Gas Corporation (KOGAS) were awarded the rights to develop the field, the terms of the proposed deal are $ 5.5/boe Remuneration Fee Bid and 400 million scfd Plateau Production Target. The Akkas gas field

is located in Anbar province, in the Western part of Iraq near the Syrian border. Its gas reserves are estimated at 5.6 trillion cubic feet (158 billion m^3).

2. Siba field, which lies near the border with Kuwait, was awarded to Kuwait Energy and Turkish Petroleum International Company with a bid of $ 7.50/boe. Siba field has reserves of 1.13 trillion cubic feet (31 billion m^3).

3. Mansuriya field, which lies in Diyala province, northeast of Baghdad, has 4.5 trillion cubic feet of reserves (127 billion m^3). The field attracted a bid of $ 7/boe from Turkish Petroleum International Company, which will work alongside Kuwait Energy and Kogas.

In Kuwait, interest of natural gas is increasing, in this line, Kuwait Oil Company (KOC) has signed a 5- years technical services contract with Royal Dutch Shell Plc. at the beginning of 2010. According to the contract, Shell is going to provide technical support to developing the gas fields discovered in north Kuwait back in 2006. It is worth mentioning that the gas was discovered in fractured rocks under high temperature and high pressure conditions, the discovered gas is of high percentage of hydrogen sulfate. Kuwait Oil Company aims to increase the free gas production rate from 140 million scfd to 2.5 billion scfd in 2030. KOC is also planning to invest between $ 5 to 7 billion within the next five years in projects that include developing the early production facilities, pipelines, new wells drilling, gas pressure boosting stations, building a new hospital and purchasing tugboats. The named projects will be undertaken according to Build- Operate- Transfer system (BOT).

In Libya, at the 1st quarter of 2010, 85% of Intisar gas field transportation- project (103 I) was completed, the project was implemented by Zeuetena Oil Company with plans to transport gas to the costal network. It is one of the projects assigned to the National Oil Corporation to raise production levels, improving performance and maintaining a clean environment, this is supposed to be achieved through the implementation of several projects called production capacity improvement.

The Zeuetena Oil Company assured that this project will provide the coastal gas network with huge amounts of gas estimated at about 250 million scfd in the first stage. Upon the completion of the constructions jobs in all phases, the amounts of gas could reach about 1500 million scfd , this will contribute to the replacement of heavy fuel oil currently used in industrial complexes, production units and power plants on the Libyan coast with gas.

In Egypt, at the beginning of 2010, the Egyptian General Petroleum Corporation signed two agreements with Apache Corp. for the exploration and production of oil in the western desert, the total area of the two agreements is 6400 sq km, with estimated investments of about $ 55 million. The two agreements include the drilling of 13 wells, and contracts- signing bonus of $ 39 million. The production from the western desert is expected to double within the next ten years, as it may compete with the South Al Wadi in the near future after becoming an integrated system for oil and gas industry.

In 3rd quarter 2010, 26 exploration agreements were signed with international companies and minimum investments were estimated at $ 2.6 billion. This was followed by signing three agreements for oil

exploration and exploitation in the western desert, the first was signed between the Egyptian General Petroleum Corporation and Apache Corp. and Dana Petroleum to add exploration commitment time span for the activities in East Bani Suef in western desert, with minimum investment of $ 12.5 million, and drilling of 5 new wells, the agreement also included a contract signing bonus of $ 6 million. The second agreement was about Fayoum area in western desert, it was signed between Egyptian General Petroleum Corporation and American Merlon International Company, to add exploration commitment time span with minimum investment of $ 24 million, and drilling of 6 new wells, the agreement also included a contract signing bonus of $ 3 million. The third agreement which covers an area of 34,000 sq km, was signed with Ganoub El-Wadi Petroleum Holding Company, as the company is going –and for the first time- to explore for petroleum in the area of Al Gilf El Kebir/ Owainat in the utmost southwestern part of the Egypt adjacent to the Libyan- Sudanese borders, the agreement includes a minimum investment of $ 8 million, and a commitment to run aerial and magnetic survey, 2D seismic and drilling of two exploration wells.

The importance of such agreements comes from the fact that they support and increase the petroleum wealth, increase the reserves to meet the needs of the domestic market of oil products and natural gas and provide reserves of energy resources for the future generations, especially since the western desert region has come to represent an integrated system for oil and gas industry so as to enhance the position of Egypt's current and future Petroleum wealth in the light of what the region is characterized by as of low production cost per barrel compared with most other regions.

Egypt plans -in the forthcoming stages- to intensify its petroleum activities in remote areas located to the utmost southern, western and eastern borders, this comes within the framework of a strategic aspect to contribute to the development of these areas after the successful discovery of oil for the first time in "Kom Ombo" in Aswan, and the discovery of Al "Baraka" field which changed and corrected the concepts in prospecting and exploration in these areas, and turned them to attract global investments to the petroleum scope.

Egyptian Ministry of Petroleum and the Egyptian General Petroleum Corporation signed an agreement with RWE Dea to amend the North Alexandria and West Mediterranean deepwater concessions. Production from these west Nile Delta concessions is projected to reach up to 1 billion scfd, providing a major new source of gas for the domestic market in Egypt. The first phase will develop an estimated 5 trillion cubic feet of gas and associated condensate through subsea development of five offshore fields into a new purpose-built onshore gas plant on Egypt's Mediterranean coast, first gas is expected in late 2014. Required investments are expected to reach $ 9 billion. BP Egypt has made a number of discoveries in these concessions including the Giza, Taurus, Libra, Fayoum and Ruby in the Pliocene, and the Raven discovery in the deeper Miocene formations.

A Memorandum of Understanding was signed at the end of 2010 between Egypt and South Africa to enhance cooperation in the areas of oil and gas, the MOU included the note to establish and support partnerships in the areas of oil and gas industry between the companies operating in the two countries, and discussed cooperation in the areas of production and development of oil and gas discoveries in Egypt,

technology transfer in all areas of industry of oil and natural gas liquefaction, considered the increase of the opportunities for joint investment between the two countries and examined the available opportunities for the establishment of joint ventures. It also included the exchange of all information relating to oil and gas industry between the two countries and opportunities for marketing of petroleum products, and agreed to support the establishment of specialized training courses in oil industry for experts and staff in both countries. It was decided to form working groups to activate areas of cooperation contained in the note and held regular meetings in this area.

On the other hand, exploratory and development drilling project in Egypt until the mid-2010 represented a remarkable activity where 42 wells were drilled, 33 wells have been put on production, with total investments reached about $ 1.7 billion.

In early 2010, the Republic of Sudan has started drilling operations for the first oil well in the Sudanese Red Sea, "Tokar-1", is located in block15, in which Red Sea Petroleum Company is undertaking prospecting activities. In the 3rd quarter of 2010, the Sudanese petroleum ministry said that Sudan granted four contracts worth $ 166.5 million, for the installation of 11 new rig in two permits, Petrodar No. 3 and Petrodar No. 7, the two permits are located in south east of the country in Milot basin which produces "Dar blend" heavy crude. Sudan is anxious to increase the production of Petrodar, which is a joint venture between Chinese "CNPC" and "CINOPEC", Malaysian "Petronas", and the Emirati "Al-Thani", as a part of a plan to produce 1 million b/d of oil within three years up from current 470,000 b/d.

In a statement, the ministry said that "Great Wall Drilling Company", a subsidiary of CNPC, will install five rigs for $ 75.5 million. ZPEB of CINOPEC will install four other rigs for $ 63.3 million. Dindir Petroleum, a joint Sudanese- Chinese venture, will in turn build a rig for $ 12.1 million while the Sudanese Oil Services Company is going to build one more rig for $ 15.6 million. The statement mentioned that these are two-years drilling contracts. On the other hand, the White Nile Company which is a joint venture between Petronas of Malaysia and Sudapet of Sudan, has announced a plan to raise the production of the concession 5A from the current rate of 150,000 b/d, to reach some 60-70,000 b/d until 2013.

In Oman and after four years of winning a contract to develop gas from tight rocks, BP pulled of the contract and stated that "the recoverable reserves do not cover the cost of the project estimated at about $ 800 billion". The surprising move came less than a month after the company announced its intention to start production of tight gas from Khazzan and Makarem fields at the end of 2010. BP signed a production-sharing agreement with Oman in 2007 for the two gas fields which lie on Block 61, production was planned to reach less than 1 million m^3 with intentions to increase the level by late 2011.

Five out of the eight evaluation wells designed to develop the reserve in the block in question were completed in late 2009, BP had scheduled the rest of the wells to be completed during 2011. Within this context, the general manager of the company's branch in Oman has stated that one of those wells (Khazzan- 5) has produced more than 1 million m^3/d of gas when tested, the highest rate of production of any well drilled in the two fields.

On the other hand, the Omani ministry of oil and gas has announced in the 3rd quarter of 2010 that it was granting licenses to develop five concession areas for exploration and production after negotiations with international oil companies. Five companies were selected through the bids put forward by the ministry in the first half of 2010, bringing the number of companies operating in the oil and gas in the Sultanate to 26 companies. The concession areas that will be awarded included two offshore areas No. 40 and 50 (in the governorate of Musandam and the central region, respectively), two areas in the south of the Sultanate (36 and 38) and the fifth No. 42 extends between the governorate of Muscat and the eastern region. The ministry also raised a tender in September 2010 for the development of three other concession areas, 66 near the field Sahmah, and 67 and 39 lie close to producing fields in the south.

In the Republic of Yemen, a memorandum of understanding was signed in December 2010 between the Emirati Mubadala Oil and Gas and Yemen Company for Investments in Oil and Minerals, the MOU was on cooperation in the exploration and production sector of the oil and gas industry in the Republic of Yemen.

The terms of the MOU provided for an exchange of technical information between the two companies and for cooperation to assess opportunities to work together on new investments, field redevelopment and expansion projects and other oil and gas operations in Yemen.

B - Production, and Spare Production Capacity

It is well known that the security of energy supply has become a major concern to the oil importing countries, especially with some indications

that the demand for oil is growing at a greater- than expected rate after the retreat of the depression crises that swept the world during the past few years, the aforementioned report of Wood Mackenzie[3] stated that global demand for oil amounted to 88.3 million b/d in the 3rd quarter of 2010, while the report predicted that the demand during the entire year to hit 86.7 million b/d, 88.1 million b/d in 2011 and 90 million b/d in 2012. International Energy Agency[4] in turn predicted- in a report published in November 2010- that the demand[5] in 2011 will be close to 88.5 million b/d, growing up from 87.3 million b/d in 2010.

Although most of importing countries do not consider the subject of security of demand, but the Arab countries in general are working on developing their production and production spare capacity, both to ensure the stability of the markets and as a part of their endeavors to perfectly utilize the petroleum wealth (Table A).

UAE can be referred to as an example, where it plans to raise its production capacity to 5.3 million b/d within the next ten years, its production capacity is expected to reach 2.99 million b/d in 2013 and 3.06 million b/d in 2014.

Iraq seeks to reach a rate of 12 million b/d by the end of the current decade, this was stated in the country paper Iraq presented to the Ninth Arab Energy Conference which was held in Qatar in 2010. This-

3 WoodMac: Third-quarter oil demand sets all-time record, Oil and Gas journal, 8/12/2010

4 IEA, Oil Market Report, 12/11/2010.

5 Demand doesn't represent the consumption which include international aviation and marine bunkers and refinery fuel and loss and consumption of fuel ethanol and biodiesel.

technically speaking- will impose some significant challenges Iraq has to confront, where Iraq needs to develop infrastructure, surface facilities, equipment for produced water treatment and re-injection. Iraq needs also to develop the export routes by the ports and pipelines.

Kuwait plans to raise the rate of oil production to 4 million b/d by 2020, it is worth mentioning that the Kuwait Oil Company (KOC) has run a successful practical test started in 13 October 2010 and lasted for four days, during which the company produced 3 million b/d from its oil fields in Kuwait, this was the first time when all the fields are tested simultaneously. It confirmed that such a production rate has become a reality after the implementation of the company's production capacity testing the target strategy of 2030. On the other hand there are some plans to develop the production rate of the divided zone between Kuwait and Saudi Arabia, to increase its output to about 700,000- 900,000 b/d by 2030.

Libya endeavors to reach a production capacity of at least 2.5 million b/d by 2015, after having postponed plans to raise production capacity to 3 million b/d in 2010 because of budget constraints and changes in market conditions. The National Oil Corporation has decided in its development program, to develop and rehabilitate 24 blocks of technically, financially and economically proven oil reserves, with an approximate total cost of $ 10 billion, the plan is to be financed through loans from local banks, where the National Oil Corporation decided to lead the operations through other national companies and/or their partners. The most important fields that scheduled to be developed are:

- North of Gallo – Al waha, by adding production capacity of 100,000 b/d, with a total investment of $ 1.612 billion.

- Al Nafoura field (Ojela- Al Khaleej) by adding a production capacity of approximately 130,000 b/d, with a total investment of $ 1.320 billion.

Table A,

The Expected Production Capacities in Some Arab Countries[6]

Country	Production Capacity Million b/d	Year
Saudi Arabia	12.5	Current Capacity
Iraq	12	2020
UAE	3.06	2014
Kuwait	4	2020
Libya	2.5	2015
Divided Zone	0.7- 0.9	2030
Bahrain	0.07	2020

Many wells were put on production in 2010, "Al Amir SE-5" in Egypt for example, was drilled as an evaluation well to the north west of Jemsa Block, when tested, the well produced 6150 b/d of oil, and 6.9 million scfd of gas using a 64/64 in choke, while 4300 b/d of oil and 4.9 million scfd of gas were produced using 48/64 in choke.

A report of Dana Gas Company, stated that the production of Al Baraka field located in the concession area of "Kom Ombo" in Aswan, reached 1035 b/d after the discovery of Al-Baraka-4. The company has placed a development plan aiming to raise the rate of production from the field up to 2500 b/d in 2010.

6 Energy Resources in Arab Countries, a paper by the technical affairs dept., ninth Arab Energy Conference, Qatar, 2010.

In this regard, the announcement of H.E. the Minister of Petroleum and Mineral Resources in Saudi Arabia must be recalled, he stated that the kingdom as the largest oil producer in the world, can continue to supply oil for 80 years at its current production level even if no additional barrel of oil is discovered during that period.

In Syria, production levels in the first nine months of 2010 increased to reach 387,000 b/d, this represents an additional production of 11,825 b/d comparing with the same period of 2009.

The Yusufiya field lies in block 26 and operated by Gulfsands Company was put on production at the beginning of 2010, two wells were hooked, namely "Yusufiya -1" and "Yusufiya 3", the rate of primary production from the field reached 1200 b/d, while the capacity of the production utilities was 6000 b/d which is the expected production rate from the field in question. Production from Al Bou Kamal Petroleum Company's locations has started in the 2nd quarter of 2010, South Al Kishma field- located in Deir Ezzour governorate- was put on production with initial rate of 1000 b/d, the field is estimated to hold about 4.89 million tons of reserves (about 29 million barrels). The company is working on developing the field by drilling additional wells and building a production station, as part of its effort to reach an average production of 5,000 b/d in 2014.

Official statistics in Oman have shown that oil and condensate production levels have topped 849,000 b/d in January 2010, comparing with 844,000 b/d in January 2009. Monthly statistical bulletin issued by the ministry of national economy stated that the Sultanate produced an average of 812,000 b/d of oil and condensate in 2009. Oman has planned to increase its average daily production rate to hit 900,000 b/d in 2010.

Petroleum Development Oman (PDO) has announced at the beginning of 2010 that it has operated a new gas field "Burhan West" located to the north of its concession area. The company tied an early production facility system established by the directorate of gas in the company through a period of less than two years from the date of final investment decision. It is expected that the rate of gas production from the field will reach 1.5 million m^3/d, and 1200 b/d of condensate.

At the international level, reference can be made to Brazilian Petrobras, the company aims to become one of the largest public oil-producing companies by 2015, plans were made to more than double oil production to 5.7 million barrels a day by 2020 as it develops fields sitting below a layer of salt in deep waters of the Atlantic Ocean. The company is spending as much as $ 220 billion to finance offshore oilfields including Tupi, the Western Hemisphere's largest discovery since Mexico's Cantarell in 1976. Another example comes from Angola, production rate from some of its projects is expected to reach 1.89 million b/d between 2012 and 2013, rising its total production capacity to about 3 million b/d.

In USA, ATP Oil & Gas Corp. has started the production of oil and gas form Well-4 drilled in deep water of Atwater Valley block, Gulf of Mexico. It is worth to mention that this $ 1 billion project started production in less than 46 months (less than 4 years), it is a part of what is called "Telemark Hub", in which proved reserves are estimated at more than 49 million boe, and 23.9 million boe of possible reserves.

Chevron Corporation announced that the Perdido deepwater project, located in the U.S. Gulf of Mexico, has started crude oil and natural gas production. Production from the Great White, Silvertip and Tobago

fields utilizing the "Perdido Hub" is expected to reach full capacity of 130,000 boe/d after the drilling of additional wells.

It should be noted that the incident which involved blow out of BP's well in the Gulf of Mexico, casted a shadow over the rest of the companies operating in the offshore and made them raise the degree of caution. Statoil restored production of about 46,000 b/d of oil when it brought the Gullfaks C platform back on stream after shutting down operations in May 2010 when a well became unstable during drilling. All production from the platform was shut in on May 19th when the C-06 well encountered a pressure change and loss of drilling fluid. One pressure barrier was lost, and Statoil said that the integrity of the other barrier was uncertain. The company restarted production after plugging the unstable well with three cement plugs and one mechanical plug. Statoil said it discovered a hole in the well's casing at a depth of 1,400 m. Production was resumed from Gullfaks South and Gimle fields. Gullfaks South produces about 41,000 b/d of oil, while Gimle produces 5,000 b/d of oil.

ExxonMobil Corp. started production from Odoptu field, the second offshore field developed in the Sakhalin-1 project off northeastern Russia. The company expects Odoptu to produce up to 11 million bbl of oil in 2011 and said the startup was on schedule and within development cost expectations.

Development of Odoptu also included the construction of a new onshore oil and gas treatment facility and a flow line to the existing Chayvo onshore processing facility, 75 km from Odoptu. The Sakhalin-1 project consists of the phased development of the Chayvo, Odoptu, and

Arkutun-Dagi fields. ExxonMobil estimates that the fields contain a total resource of 2.3 billion bbl of oil and 17 trillion cubic feet of gas.

Important developments were also announced by the CNOOC Ltd. Of China, the company production in the first half of 2010 reached 149 million barrels of oil equivalent, which represents an increase of 40.8% of its production during the same period in 2009. The increase came from six new fields put on production between the year 2009 and the first half of 2010. The company has made nine new discoveries during the first six months of 2010, one major discovery was Penglai 9-1, and three medium-sized discoveries were Kenli 6-4, and Enping 24-2, and Liuhua 16-2.

Northern Petroleum said commercial gas production began at its new Netherlands field Brakel, the third of six on- shore oil and gas fields that Northern and partners are bringing into production. The company estimated some 7.2 million scfd of gas production in 2010.

Northern said it would focus on the nearby Wijken Aalburg discovery on the same licence, which was scheduled for an early 2011 start-up. It will then focus on bringing the Papekop and Ottoland oil fields into production. Brakel is the third gas field and pipeline development to be brought into production under a 2005 agreement between Northern and Nederlandse Ardolie Maatschappij (NAM), a Netherlands-based joint venture between Royal Dutch Shell and Exxon.

In Norway, Production started from Gjoa oil and gas field in Blocks 35/9 and 36/7 off Norway on November 2010. Statoil operated the project during the development phase and GDF Suez E&P Norge AS will assume operatorship during the production phase. The semisubmersible production unit on the field will also serve as

a development hub for other discoveries in the area. Gjoa's semi is the world's first production floater, and second platform off Norway to receive its power from shore, it receives electricity from a 45-km cable. Statoil estimates a recovery from Gjoa of 82 million bbl of oil and condensate and 40 billion m^3 of gas.

In Ghana, production from giant Jubilee oil and gas field off Ghana has officially started, and partners expected output to reach 55,000 b/d of oil by 2010 yearend and 120,000 b/d during the first half of 2011 when additional wells are completed, operator Tullow Oil PLC and partners said. The field in the Gulf of Guinea came on stream 42 months after the 2007 discovery. Anadarko Petroleum director for exploration affairs (partner) declared that production from the field will be economically feasible even at an oil price of $ 25/b, as the field holds more than 8.1 billion barrel of reserves.

C- Improved/ Enhanced Oil Recovery (IOR/ EOR)

Emphasis on the application of IOR comes amongst the priorities of most of the countries seeking to develop their reserves and production rates, many Arab countries are interested in this type of techniques. For example, Abu Dhabi Co. for Onshore Oil Operations (ADCO) has injected carbon dioxide in a pilot enhanced oil recovery project in Northeast Bab's Rumaitha field. The pilot project involves injecting 1.2 million scfd of dry, more than 99% pure CO_2 at 3,300 psi and 35° C. It is noted that this is the first CO_2-EOR project in the Middle East. ADCO has plans for more pilots in several of its other major reservoirs. The pilot includes one injection, one observation, and one producing well. Preparations started in 2008, while required approvals and following

wells drilling took place by late 2009. ADCO estimates the full field development needs 500 million scfd of carbon dioxide, this will save the amounts of natural gas injected to maintain the production rate of the field, and it also comes in support of the efforts to reduce the amounts of carbon dioxide in the atmosphere.

Saudi Aramco has plans to inject carbon dioxide in giant Ghawar in 2012 at a rate of 40 million scfd, this comes as a step towards reducing carbon dioxide emissions, and as a technique to improve oil recovery that can contribute to raising the rate of production from the giant field discovered in the forties of the last century. Ghawar Integrated Assessment and New Technology (GIANT) team, an interdepartmental group working on a long-term visionary endeavor to better understand and characterize the oil field, came across an interesting finding while looking at ways to maximize the reservoir's oil recovery percentage. The researchers found an extensive micro-pore system of hidden passages in carbonate rock, where a significant proportion of unrecovered oil resides. Nowadays, the GIANT team is analyzing this newfound potential and finding ways to tap into the as-yet untapped world below where appropriate technology can increase the recovery factor of the said field.

In Oman, PDO announced the successful operation of the first integrated project of an improved oil recovery in Marmol oil field, a project that will add 8,000 b/d of oil for the production of the company during the coming years. The project is considered as a unique model for the increased use of new technologies to improve production of some of the company's matured oil fields.

At the international level, ExxonMobil Corp. said its enhanced oil

recovery project (EOR) at Malaysia's Tapis field will start in 2013, with an estimated gross investment of more than $ 1 billion. Tapis field is one of seven mature fields offshore Malaysia that ExxonMobil and state-owned Petronas have agreed to develop as part of a 25-year production-sharing contract. The field lies in 64 m of water and produces extra-light, low-sulfur crude.

In Spain, Leni Gas & Oil PLC (LGO) planed to start a pilot nitrogen enhanced oil recovery project on Ayoluengo's upper Jurassic west flank reservoirs in Spain's Burgos region.

The company expected to start construction of the facilities at yearend and commence injection in 1st quarter 2011.

Ayoluengo's upper Jurassic west flank reservoirs contain 27.31 million bbl of STOOIP[7] and have a cumulative production of only 1.4 million bbl of 37° gravity oil. The company explained that it selected nitrogen for the EOR project because liquefied nitrogen is easier to produce and transport than carbon dioxide and does not require water for reservoir pressurization or waterflooding. Another reason was because nitrogen is inert, it is not corrosive and can function for both reservoir re-pressurization and to support water or polymer floods.

The current Ayoluengo production is from the east flank upper Jurassic reservoirs that contain 79.39 million bbl of STOOIP and have a 21% recovery to date.

In the U.K., a new study published by an academic energy expert claimed that oil recovery using carbon dioxide could lead to production of an extra 3 billion bbl of oil from the North Sea. Counting on U.S.

7 Stock Tank of Oil Originally In Place.

experience in this field, the study said an additional 4-12% of oil in place can be extracted using carbon dioxide injection.

It seems that nitrogen injection technology is widely spreading in the USA, as ExxonMobil Production Corp. will employ nitrogen recovery and cryogenic gas processing equipment for work to extend the producing life of Hawkins field in northeast Texas. ExxonMobil expects to recover an additional 40 million boe at mature east Texas Hawkins field, the company said that over 70 years the field has produced more than 800 million bbl and is one of the largest ever discovered in the state.

Notably, there are 193 IOR projects in USA, among which 46 projects use steam injection, 2 projects use hot water injection, 12 projects use in- situ combustion, 3 projects use polymers and surfactants injection, 3 projects use nitrogen injection, 12 projects use miscible hydrocarbons injection, 1 projects uses immiscible hydrocarbon injection, 5 projects use immiscible CO_2 injection and 109 projects use miscible CO_2 injection[8].

In the same line and within the framework of international companies' cooperation, Schlumberger and Shell announced a multiyear research technology cooperation agreement focusing on improving the recovery factor of oil and gas reservoirs and extending the life of existing oil and natural gas fields. The research collaboration is an expansion of the joint work on several fronts, it will initially focus on two specific projects: reservoir surveillance for enhanced oil recovery (EOR) projects, and Digital Rock for detailed numerical modeling of reservoir rocks.

8 Oil and Gas Journal, Producing Enhanced Oil Recovery (EOR) Projects in USA, 19/4/2010.

D- Developments in Reserves Estimations

In 2010, some countries have had initiatives to report higher estimates of the reserves, nevertheless, some of these increases are modest comparing to the size of global reserves, but they reflect the tireless efforts in prospecting and exploration, and emphasize the role of modern technologies to access more reserves.

Italy, for example, declared in February 2010, that the estimates of the reserve in offshore Ombrina Mare field reached 12 million barrels of proven reserves, and 28 million barrels of potential reserves, that to say represents about twice the estimates of the reserve for this field in 2008. The re- estimation was invoked by reinterpretation of seismic data of the field which covers an area of 100 sq km, in addition to analyzing test data and other information from wells.

Estimates were high in some countries including Iraq, 25% of reserves increase was declared, bringing the proved recoverable reserves of the country to 143.1 billion barrels[9], and ranking Iraq as the world's third largest in terms of the size of the reserves after Saudi Arabia and Venezuela. According to the announcement, 71% of the oil reserves are located in the southern fields especially the fields of Basra, while 20% of the reserves are in the northern fields mainly in Kirkuk, East of Baghdad field contains 9% of these reserves. Most of the reserves - according to the declaration – are in the fields of West Al Qurna and Zubair in Basra (southern Iraq) where West Al Qurna field can be seen as the largest Iraqi oil fields in terms of proven reserves (43 billion barrel), and thus marking it as the second largest field in the world after the Ghawar field in Saudi Arabia.

9 Ministry of oil in Iraq, Official website, 4/10/2010.

Only one week later, Iran[10] declared that its reserves estimation increased to reach 150.31 billion barrel. Assuring that the figure was calculated six months earlier, Iran said that the number is likely to increase as the reserves estimating is still underway. It must be stated that Iran oil reserves[11] were estimated at 137.62 billion barrel at the beginning of 2010.

Later on, the managing director of the Pars Oil and Gas Company announced by late November 2010, that Iran has discovered a new oil layer with about 34 billion barrels of in situ reserves in the Ferdowsi gas field, located in the Arabian Gulf[12]. Appraisal drilling operations were underway to estimate the deposit more accurately.

Iran also raised estimate for Iran's gas reserves to 33.1 trillion cubic meters[13], from preveous 29.61 trillion cubic meters. This- according to a declaration of oil minister- came after Iran had discovered a new gas field in the southern Hormuzgan province to the east of Bu Shaher and Bandar Abbas, 140 km to the south west of Bandar Lingeh, the Sefid field has an estimated 70 billion cubic meters of GOIP[14], of which over 50 billion cubic meters are recoverable.

Amongst other countries came Venezuela[15] who raised its oil reserves

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10 Iran ministry of oil, official website, 11/10/2010. OAPEC SG annual report doesn't include the mentioned figure as it is not included in OPECs' publications yet.

11 OAPEC SG annual report, 36, 2009.

12 Tehran Times, 22/11/2010

13 Iran ministry of oil, official website, 11/10/2010.

14 Gas Originally In Place.

15 OAPEC SG annual report reserves estimations don't include heavy oil reserves (Canada, Venzuela and others), this is why Venezuela reserves were stated at 99.38 billiob barrels in SG report, 36, 2009.

by 23% to some 211.17 billion barrels, this was invoked by an increase of 39.24 billion barrels resulted from re- estimating heavy oil reserves in Orinoco belt[16].

Moreover, US Geological Survey[17] in a report published in April 2010, stated that undiscovered technically recoverable gas resources in Levant basin (east Mediterranean) are estimated at 122 trillion cubic feet (3.45 trillion cubic meters). This estimation came within the first revision of the hydrocarbon potential in the region of the world. USGS Energy Resources Program Coordinator said that the Levant basin province is comparable to some of the other large provinces around the world and its gas resources are bigger than anything that has been assessed in the United States. On the other hand, USGS reported that undiscovered technically recoverable oil resources in Levant basin are believed to be at about 1.7 billion barrels, undiscovered gas resources in Nile Delta[18] were estimated at about 223 trillion cubic feet (6.3 trillion cubic meters).

However, resources estimations didn't always go upward, the U.S. Geological Survey estimated 896 million barrels of conventional, undiscovered oil and 53 trillion cubic feet of conventional undiscovered non-associated gas within NPRA[19] and adjacent state waters.

The estimated volume of undiscovered oil is significantly lower than in 2002, when the USGS estimated that there was 10.6 billion barrels of

16 Oil and Gas Journal, 19/3/2010

17 USGS, Natural Gas Potential Assessed in Eastern Mediterranean,8/4/2010

18 USGS, News Room,18/5/2010

19 National Petroleum Reserve in Alaska.

oil[20]. The new results, roughly 10% of the 2002 estimate, were primarily due to recent exploration drilling indicating gas occurrence rather than oil in much of NPRA.

E- Hydrocarbon Discoveries in 2010

According to the available information, 215 new discovery were made in 2010, of which 123 were oil discoveries and 92 discovery of gas, within these discoveries 98 new ones were reported in Arab countries, including 56 oil discoveries, 42 discovery of gas, 41 oil discoveries and 22 gas discoveries were officially reported Egypt[21]. Among the discoveries made in Arab countries, reference can be made to:

In UAE, Dubai has announced at the beginning of 2010 the discovery of a new oil field called Al Jalilah, the new discovery lies to the east of Rashed field. The announcement stated that the discovery could be brought to production by 2011. Information Office of the government of Dubai declared that the estimates of discovered reserves and expected production rates were still under review and evaluation. This was later followed by an announcement of Global Industries Ltd. that its wholly owned subsidiary, Global Offshore International, Ltd., has been awarded a contract from Dubai Petroleum Establishment (DPE) to perform the Al Jalilah Platform and Pipelines EPC project[22]. The project covers the design, construction and installation of a basic unmanned offshore wellhead platform, one 27 km x 6" gas lift pipeline, and one 27 km x 12"

20 USGS, News Room, 26/10/2010

21 Energy Data Collection Form, 9/2/2011

22 Engineering, Procurement, Construction

oil production pipeline to one of Dubai Petroleum's existing offshore processing facilities[23].

In Tunisia, two gas and condensate discoveries were reported in Nawara Concession, one of them "Ahlam-2" produced about 3300 boe/d when tested.

Saudi Arabia in turn reported a new gas discovery named Jalameed field.

Two new discoveries were made in Syria, namely Rasheed and Abu Khasab. A new reservoir extension of Kherbet field was also reported. The field is operated by Gulfsands that works within a joint venture with the General Petroleum Corporation called Dijla Petroleum Company.

Exploration activities in Iraq led to two new discoveries, one of oil and one of gas.

In Libya, seven discoveries were made, among which one was of gas in Ghadames basin, the rest were oil discoveries.

Egypt officially reported 63 discoveries of oil, gas and condensate, some of the discoveries are listed in table B.

Oman made 3 discoveries, one of which was reported as giant oil discovery, the rest were of gas.

Morocco in turn announced 1 gas discovery in Rabat basin.

23 OAPEC, Energy Monitor, Year 30, Issue 3, 2010.

Table B
Some Hydrocarbon Discoveries in Arab Countries in 2010

Country	Operator	Field/ Block	Well	Depth m	Type of Discovery G, C, O	Test Results	Reserves
UAE		Al Jalilah					
Tunisia	OMV				C		
	OMV	Nawara	Ahlam-2	4060	G C	3300 boe/d	
	OMV	Nawara	Ritma-1	4035	G C		
Algeria	Petroceltic International plc	Illizi	INW-2		G	16.7 MM scfd	
	Gazprom	Berkin basin	Rhourde Sayah-2		G C	2.65 MM scfd G+ 420 b/d C	
Saudi Arabia	Saudi Aramco	Jalameed	Jalameed-1	2985	G	13 MM scfd	
Syria	ONGC Videsh Ltd+IPR	Block 24	Rasheed-1	1937	O	1343 b/d	
	ONGC Videsh Ltd+IPR	Block 24	Abu Khashab-1	950	O	950 b/d	
	ONGC Videsh Ltd+IPR	Block 24	Abu Khashab-2 (Dibbaneh Formation)		O G	1686b/d + 3.76 MM scfd	
	ONGC Videsh Ltd+IPR	Block 24	Abu Khashab-2 (Chillo Formation)		O	1553 b/d	
	Gulfsands	*Kherbet	Kh-18	1926	O	2385 b/d	* New reservoir extension
Iraq	MOL	Bajeel Akri	B-1	3967	O G	3743 b/d + 0.62 MM scfd	
	WesternZagros Resources Ltd.	Keler-Bauanor	Kurdamir-1		G C	18 MM scfd G + 1548 b/d C	
Libya	Sirte Oil Co.	Ghadames	A2-MN-151		G	4.5 MM scfd	
	Sonatrach	Ghadames	G1- 652/	2589	O G	1290 b/d + 0.3 MM scfd	
	AGOCO OIL	Sirte basin/ MN131	O1-MN131	2853	O G	662 b/d + 0.9 MM scfd	
	AGOCO OIL	Sirte basin/ MN4	H1- MN4	3109	O G	3104 b/d + 2.9 MM scfd	

Country	Operator	Field/ Block	Well	Depth m	Type of Discovery G, C, O	Test Results	Reserves
Libya	AL Waha	Sirte basin/ Permit59	6F159-	2812	O G	2784 b/d + 0.9 MM scfd	
	Turkish Petroleum Co. Ltd.	Murzuk Basin/ Block 3	A103/147-	3000	O G	1300 b/d	
	Turkish Petroleum Co. Ltd.	Murzuk Basin/ Block 3	H103/147-	2834	O	1050 b/d	
Egypt	GPC	Nubia Reservoir	Amer-1		O	1025 b/d	65 MM bbl
	GPC	Nubia Reservoir	Amer-2		O	975 b/d	
	Dana Gas	North Zeit	Lurkan-1		O	4714 b/d	
	Dana Gas	East Bani Sweef	Fayoum-2		G	600 boe/d	
	Dana Gas	West Manzal	Orchide-1	1700	G	12.5 MM scfd	
	Dana Gas	West WD	West WD-1		G	12.5 MM scfd	
	Dana Gas	Salma Delta North	Salma DN-1		G C	16.1 MM scfd + 561 b/d C	
	Dana Gas	South Abu El Naga			G		5090- bcf
	Tharwa	West Esh El Mallaha			O	1300 b/d	
	BP Egypt	Hedwa	WMDW-7	6350	G		
	Trans Globe Energy	Ghazalat	SNW-1		O	250 b/d	
	Vegas Oil & Gas S.A.	East Ghazalat	Sabbar-1	1400	O	500 b/d	
	Apache Corporation	Matruh basin	Opera-1		O	890 b/d	
	Apache Corporation	Matruh basin	Sama-1		G C	44 MM scfd + 2910 b/d C	
	Apache Corporation	Faghur basin	West Kalabsh-1		O G	4554 b/d + 10.1 MM scfd	
	Apache Corporation	Faghur basin	West Kalabsh-2		O G	5000 b/d + 130 MM scfd	
	Kuwait Energy	North Ras El Qattara	Diaa-1		O	1600 b/d	
	Circle Oil Plc	Gemsa	Amer SE-5		O G	6150 b/d + 6.9 MM scfd	

Country	Operator	Field/ Block	Well	Depth m	Type of Discovery G, C, O	Test Results	Reserves
Egypt	Melrose Resources plc	SE Mansoura	Damas-1		G	12 MM scfd	30 bcf
	Dana Petroleum	Nefertiti	N-1	4312	O	1544 b/d+ 0.43 MM scfd	3.9- 6.5 MM bbl
Oman	RAK Petroleum Company	Hamra Al Duru	Hamrat Duru 4 (Nateh-A)	1620	G	11 MM scfd	
	PDO	Hamra Al Duru	Hamrat Duru 4 (Nateh-C-D)		G	5 MM scfd	
	PDO	Gabbar south	4 explorations, 1 evaluation well		O		1 b bbl
Morocco	Circle Oil	Rabat basin-Cibao	CGD-11		G	13.29 MM scfd	

At the international level, many big discoveries were made, however, some countries tend to declare giant deposits finds, like when an oilfield with an estimated 1.8 billion barrels was discovered in the north of Afghanistan[24], the country's ministry of mines has stated. It is understandable that some countries announce high or overstated reserves for political or economic reasons, it must be noted here that the statement of the Afghani ministry of mines did not mention how that discovery was made. The announcement stated that accurate evaluation of the discovered reserves needs six months. It is also important to note that this declaration was issued in August, it came just after the announcement of Afghanistan about its intention to launch a international bid round for oil exploration in June.

24 Oil and Gas Journal, 30/8/2010

F- Unconventional Hydrocarbon Resources

Unconventional resources have gained emphasis in 2010 either in Arab countries or on the international level. Syria -for example- has announced in the first half of 2010 the discovery of 37 billion tons of shale oil in Khanser region- near Aleppo city- with a layer thickness reaching about 240 m. first phase drilling activities of the project includes 48 wells of which 23 wells were completed at a span of 2 km, the rest of the wells are expected to be completed by 2011. The General Establishment of Geology and Mineral Resources indicated that the oil content in the samples taken from Khanaser ranges between 9.6- 9.7%, and the thermal content is more than 6452 J/g.

Building on these results, the establishment has laid a strategic plan to evaluate the discovery and prepare a feasibility study in order to announce a tender file in mid 2012. The survey process of the project started in the 4th quarter of 2008, preliminary studies had indicated -in the 3rd quarter of 2009- that proved reserves are estimated at 2.5 billion tons, but this figure is in need of further studies as it could reach more than 50 billion tons.

In the 2nd quarter of 2009, Natural Resources Authority of Jordan brought the Oil Shale Concession Agreement with Estonia to the cabinet for ratification. In 2009, the government signed a convention to study the possibility of building an electric power planet with a capacity of 600 to 900 mega watts, the company will submit the study to the government by the end of 2011 to reach a commercial agreement which, in case it was approved, would be ready in 2015. The draft of the project includes the construction of shale oil retorting plant in Al Attarat area to south west of Qatrana, to initially produce about 36,000 b/d of

oil. The agreement states that the company shall pay $ 175 thousand per annum starting from the effective date of the agreement for the purpose of training and developing the local staff, $ 100 thousand of which is for the Natural Resources Authority, and $ 75 thousand for the sustainable development projects. The government has also signed a memorandum of understanding MOU with a Jordanian- Russian- Saudi consortium, according to which the consortium is going to explore for oil shale in the south of Jordan. The consortium is composed of Jordan Oil Shale Energy Company (JOSECO), Saudi International Corporation for Oil Shale Investment (INCOSIN) and Russian Pioneer. Under this MOU, 12 exploration wells are to be drilled, geological, geophysical and geochemical studies are to be undertaken to tap a possible 1 billion tons of oil shale reserves within the first year of the effective date of the MOU. In the second year, the company will carry out engineering, environmental and feasibility studies on the use of advanced Russian technology to evaluate and report to the NRA.

Based on the understandings achieved by the Jordanian government with several local and international companies, it is expected that the contribution of oil shale shall be raised by 14% of the total energy mix by 2020.

By late 2010, a representative of Jordan Energy & Mining Ltd. declared that Jordan was going onward to sign a 40 years oil shale utilization project, this was presented in the annual conference of Colorado School of Mines in USA. He stated that the project could start producing oil from oil shale by 2014 at a rate of 15,800 b/d, capital expenditures of the project are estimated at $ 1.8 billion, while operation cost will be $ 23 per barrel.

In Morocco, San Leon Energy, provided updates by the 3rd quarter of 2010 on its Tarfaya oil shale project as its in-situ vapour extraction (IVE) process is developed and as the test pilot plant has progressed from the detailed engineering phase into the construction phase, new road connecting the Pilot Plant site to the main highway completed, first shipment of equipment and materials for the Pilot Plant facility arrived in Morocco, the Environmental Impact Assessment ("EIA") covering the test pilot plant has been approved by the Moroccan Ministry of Environment and the hydraulic fracturing analysis study was commenced. Following the signing of a memorandum of understanding with National Office of Hydrocarbons and Mining ("ONHYM") in June 2009, the Tarfaya Oil Shale Pilot Plant project has progressed from the detailed engineering phase to the construction phase. Careful planning, expertise and precise engineering will unlock the enormous potential of Tarfaya of up to 50 Billion barrels of oil.

At the international level, French energy authorities[25] have officially awarded shale gas exploration permits after some delay due to the number of companies that competed for licenses in the southeastern part of the country. Total E&P France and a unit of Devon Energy Corp., Oklahoma City, were awarded Montelimar Permit for 5 years and an outlay of €37.8 million. The 4,327 sq km awarded is 60% of the original surface requested. Total E&P France has acquired Devon's French affiliate, pending ministerial approval Acreage sought by Schuepbach Energy LLC, Dallas, Dale Gas Partners LP of Texas, and Franco-Belgian GDF Suez, was split in two. The Villeneuve-de-Berg Permit covers 931 sq km, and the Nant Permit covers 4,414 sq km. Both are awarded for 3

25 Oil and Gas Journal, 1/4/2010

years. For Berg the outlay is €39.9 million for seismic reprocessing, shooting 30 line-km of new seismic, and drilling two wells to 2,000-3,200 m, the last 1,000 m laterally with a hydraulic frac in the shale. The Nant program is €1.7 million for seismic reprocessing, shooting 30 line-km, and drilling a 500-m well. The ministry awarded the Navacelle Permit, whittled by one third to 216 sq km, to Egdon Resources (New Venture) Ltd. of the UK, Eagle Energy Ltd., and YCI Energy Ltd. for 5 years, seismic surveys, and one well at a cost of €3.6 million. Mouvoil SA of Switzerland won the Bassin d'Ales Permit for 5 years and €1 million for seismic and drilling of one well. Bridgeoil Ltd. and Diamoco Energy were awarded the 503-sq-km Plaine d'Ales Permit for 4 years. Work program is €1.5 million for seismic reprocessing and drilling a new well or reentering a 1949 m well that found heavy crude.

In Australia, Australian Worldwide Exploration Ltd. (AWE), Sydney, intends to follow up what it sees as a major reserve potential in shale gas and tight gas acreage in the North Perth basin of Western Australia after analysis of the Woodada Deep-1 well suggested a resource of as much as 20 trillion cubic feet of gas. AWE reentered Woodada Deep-1 in April 2010 and carried out a core program and logging run across the prospective Carynginia shale formation, which has three distinct shale intervals. As a result, the company estimates that the middle shale section alone holds gross gas-in-place of about 20 trillion cubic feet of which the recoverable reserve potential is in excess of 4 trillion cubic feet.

In Argentina, Spanish Repsol YPF SA, found 4.5 trillion cubic feet of unconventional natural gas in the country's largest discovery in 35 years.

Repsol found so-called tight gas reserves at the "Loma La Lata" area in the Patagonian province of Neuquen after its YPF unit drilled four exploratory wells in the region. The company also said that it discovered so-called shale gas in the province. The YPF find may contain enough gas to supply the country for as long as 50 years

In China, Work has started on a proposed 60-well coal bed methane development drilling program and gas gathering system on the Shouyang block, stated Far East Energy Corp., the gathering system was said to be placed in service around the beginning of 2011 to eliminate flaring and begin gas sales, the company said. Three wells have been spudded in October 2010, and all 60 wells are to be completed by mid-2011. Of the 60 wells, 51 are to be drilled in the 1H pilot area. Far East also fracture stimulated 10 wells, the combined production of them reached 1 million cubic feet per day, while the production rate is expected to double after stimulation.

China unconventional gas production is expected to grow to participate in fulfilling the demand in 2030 according to some studies. However, the growth will not be enough and China will need to secure additional quantities of imported gas, whether in the form of liquefied natural gas, or by importing gas via pipelines. Some studies predicted that a Chinese demand for liquefied natural gas will be about 46 million tons/year in 2020, compared with earlier estimates of 31 million tons/year. Despite the fact that the growth of unconventional gas production is still relatively slow, but large quantities of coal bed methane and industrial gas will enter the Chinese market to reach a limits of 11 billion cubic feet per day until 2030, where the demand for gas in China will reach 43 billion cubic feet per day in that year, compared with 9 billion cubic feet per day in 2009.

In Brazil, OGX Petroleo e Gas Participacoes SA, Rio de Janeiro, said by late 2010 that gas flow from a Devonian shale discovery 12.5 km from its first find in northeastern Brazil's Parnaiba onshore basin supported a 20-m gas flare on drillstem test. The flow came at the 1-OGX-22-MA well at the Fazenda Sao Jose prospect. After drilling the first 10 m of the Upper Devonian section with good gas shows, at a depth of 1,520 m, a drillstem test resulted in 1,950 psi wellhead pressure with the 20-m flare, drilling is planned to continue towards other targets and a projected total depth of 3,200 m.

In Canada, Quicksilver Resources announced that it has unlocked huge unconventional gas plays across North America in the British Colombia (B.C.) Horn River basin, this has encouraged the company to set a plan to test some prolific stratigraphic horizons. The Horn River is better known for gas, with estimates of as much as 500 trillion cubic feet in place. It is considered as one of the best shale gas resources in North America, the company found gas at a depth of about 3,000 m.

In India, State-owned Oil and Natural Gas Corp (ONGC) plans to invest $ 4.05 billion in producing natural gas from its ultra deep-sea UD-1 discovery in a block that sits next to Reliance Industries' prolific Krishna Godavari -D6 fields. The company has tentatively planned a capital expenditure of $ 2.31 billion in producing gas from UD-1 discovery and another $ 1.73 billion in operating expenditure. The discovery UD-1 in the southern discovery area is situated in ultra deepwater at a water depth of 2841 m. An in-place volume of 82.38 billion cubic feet of gas has been established in this area.

In Poland, Italy's Eni SPA said by late 2010 it plans to start drilling for shale gas in the Baltic basin in northeastern Poland in 2011. The

company will become operator of three licenses totaling 1,967 sq km. The commitment includes the drilling of six exploration wells.

The latest edition of the International Energy Agency's annual 'World Energy Outlook' of November 10, 2010, forecasted Australian gas production overtaking Norway towards the end of the projection period (2035) to become the third-biggest OECD gas producer, following the United States and Canada. The main point supporting this projection was that Australian gas production grows strongly, more than tripling over the projection period, driven mainly by LNG export projects, with a significant part of which rests on coal bed methane production.

In Ecuador, Ivanhoe Energy Latin America, announced that it has successfully produced oil at its second appraisal well in the Pungarayacu field on Block 20 following steam injection operations. The importance of this news comes from the fact that the Pungarayacu oil field has been known for 30 years, these are the first barrels of oil ever to have been produced from the field.

In USA, a new record was reported by Brigham Exploration Co. Sorenson 29-32 1H, a long horizontal well completed in the Bakken formation, has tested 4,335 b/d of oil and 4.79 million scfd of gas for a combined rate of 5,133 boe/d. That rate represents a noticeable record production level for the more than 2,700 horizontal wells drilled in the Williston basin until early 2010. Brigham has completed five long-lateral high-frac stage wells with an average flow rate of about 2,980 boe/d each.

Chief Oil & Gas LLC, said that its Marcellus shale production in Pennsylvania has reached 100 million scfd of gas equivalent from 42 wells and that it expects to start 2011 at 115 million scfd . The most

recent well the company placed on production exceeded 15 million scfd from a 4,994-ft lateral.

On the other hand, CEO of Americas' Chesapeake Energy -one of the first oil and gas producers to develop shale gas properties in the United States- said that "discovery bonanza" in the US is over and that investors shouldn't expect major new shale discoveries. A consultant with Gerson Lehrman Group, said that such a statement[26] is grim news for the natural gas industry, and the reason for the reluctance of many companies from investing in shale gas industry has not been that no more shale gas plays existed, it was rather due to the steadily declining gas prices from about $ 5/ million Btu to $ 3.60 / million Btu. He added that given the high decline rates for all shale gas wells and the steady price pressure from an overwhelming volume of available LNG, the shale gas era in the USA could taper off beginning in 2012 and end by 2020.

Major oil exploration and production development in the Arab countries and the word are summarized below.

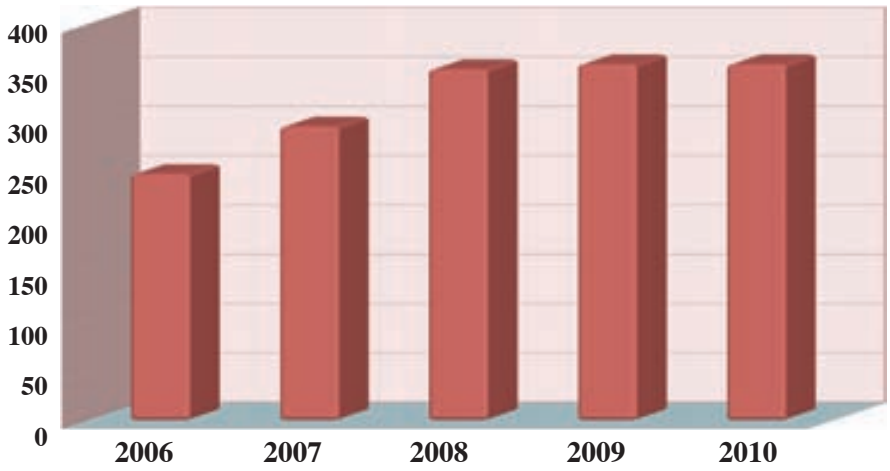
1- 1 Seismic Surveys

No significant change in the number of crews working worldwide between 2009 and 2010 was recorded, the number reached an average of 361 crew/month in 2010, which is the same number of the previous year as shown in **Figure (2-1)**.

26 Oil and Gas Financial Journal, 15/10/2010

Figure 2-1

Seismic Surveying Activity in Different Parts of the World, 2006- 2010
(Crew/month)



However, a growth was recorded in Latin America from 35 crew/month in 2009 to 40 crew/month in 2010. This may be attributed to increasing exploration activities in Brazil after the huge discovery achieved in 2008 and 2009.

On the other hand, Number of crews working in Canada, Europe and Far East decline slightly as shown in **Table (2-1)**.

1- 2 Exploration and Development Drilling

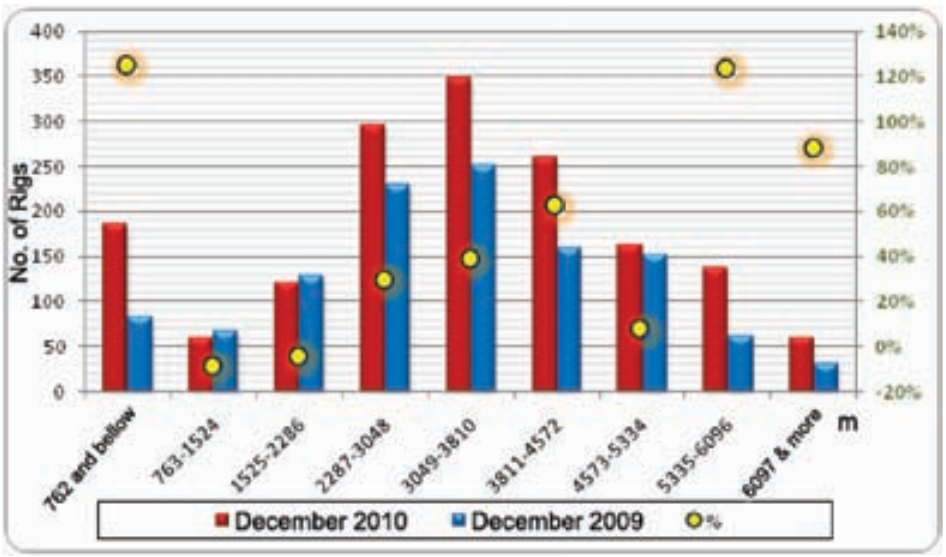
A survey of the number of rigs contracted to reach different depths between January 2009 and January 2010 was revealed by Smith International, Inc.

The number of rigs drilling to reach depths less than 760 m (shallow wells) has increased by 124%, while there was a decrease of the drilling

depths ranging from approximately 760-1500 m. the number of rigs working on drilling deep wells (2287m to 4572 m) has significantly increased, this reflects the trend towards what can be described as hard oil. Graph (B) shows a comparison of the number of rigs drilling to different depths in December 2009 and 2010.

Chart B,

Comparison of Deep Drilling Activities in 2009 and 2010



It is obvious that the drilling market was rejuvenated in 2010, as the number of rigs operating worldwide has increased by 30% from 2278 rigs in 2009 to 2963 rigs in 2010, but it is still bellow 2008 average of 3336 rigs. **Figures (2-2)** , **(2-3)** and **Table (2-2)**.

Figure 2–2

Active Drilling Rigs Worldwide, 2005-2010 (Rigs)

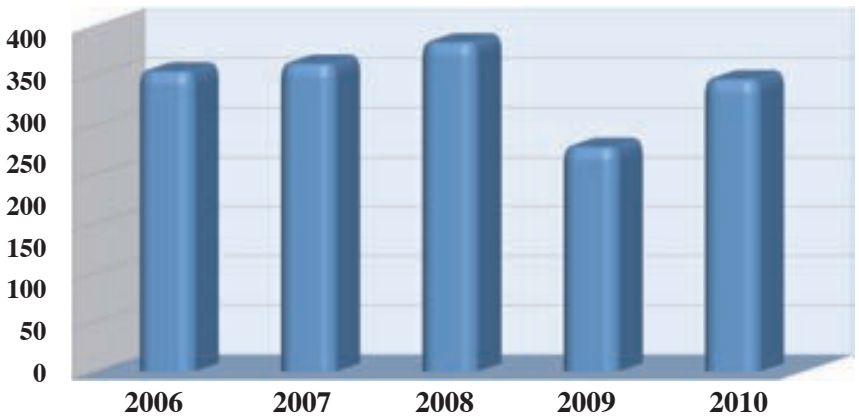
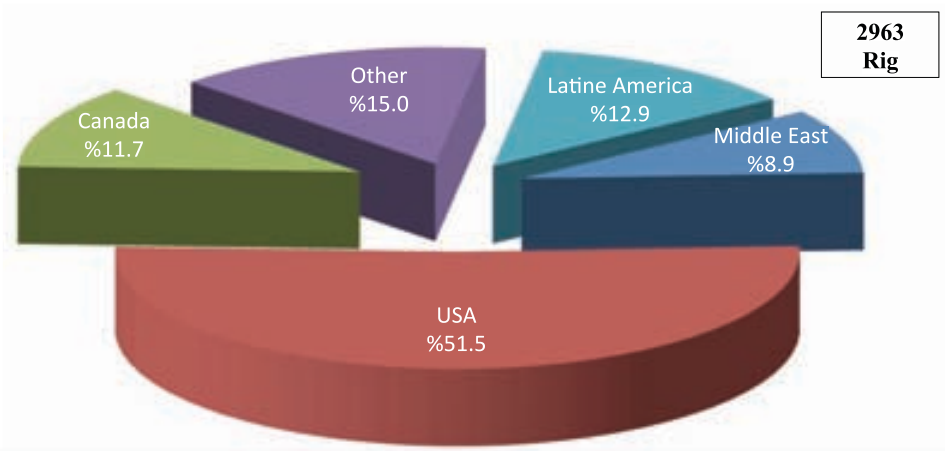


Figure 2–3

Distribution of Active Drilling Rigs Worldwide, 2010 (%)



Many discoveries were achieved in the Arab countries as previously mentioned, 5 in Tunisia, 13 in Algeria, 63 in Egypt and 7 discoveries in Libya. Generally speaking, all Arab countries found new discoveries in 2010 except for Bahrain, Qatar and Kuwait.

As for non- OAPEC countries, Oman and Morocco stated 3 and 1 discoveries respectively. A huge gas found was recorded 130 km to the north of occupied Palestine coast, reserves were estimated at about 450 billion cubic meters. **Figures (2-4)**, **(2-5)** and **Table (2-3)**.

Figure 2-4

Oil Discoveries in OAPEC Member Countries and Other Arab Countries, 2006-2010

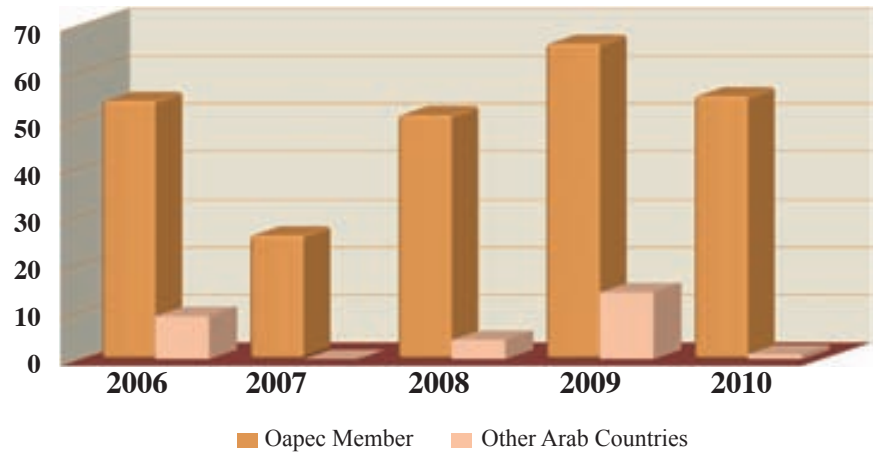
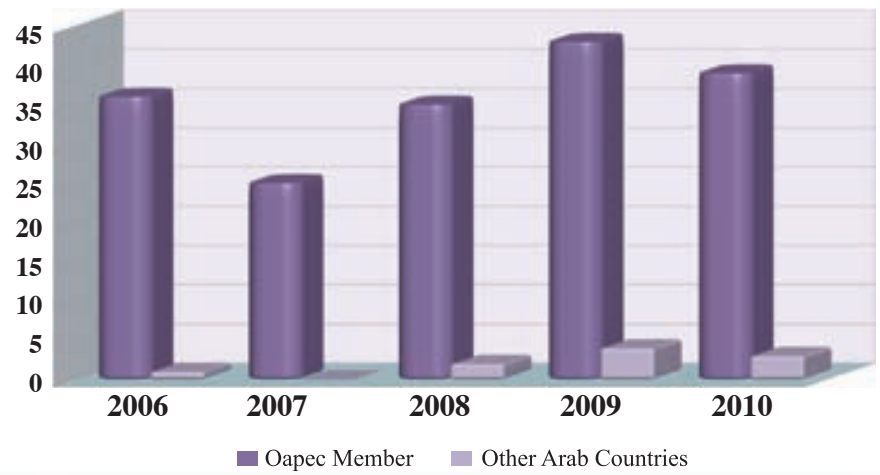


Figure 2-5

Gas Discoveries in OAPEC Member Countries and Other Arab Countries, 2006-2010



2. Oil and Natural Gas Reserves:

Estimates indicate a rise in oil and natural gas reserves in 2010, nevertheless, such estimates declined in some countries.

2- 1 Oil Reserves

World oil reserves rose slightly by 0.3% from 1185 billion barrels in 2009, to 1188.73 billion barrels in 2010, these figures exclude non-conventional sources such as tar sand and shale oil in Canada where BP statistics[27] stated them at 27 billion barrels, while OGJ reported conventional and non-conventional reserves in Canada[28] to be more than 175 billion barrels. This report doesn't take into consideration the bitumen and very heavy oils of Orinoco Belt in Venezuela estimated at more than 112 billion barrels according to latest published figures.

2-1-1 OAPEC Members and Other Arab Countries

OAPEC's members proven oil reserves increased marginally between 2009 and 2010 to reach 670.16 billion barrels, thus forming 56.4% of the world reserves, leading the total Arab countries reserves to 683.66 billion barrels, which equals to 57.5% of total world reserves.

This increase came mainly from Egypt who declared an increase of 1.4% of its reserves from 4.41 billion barrels in 2009, to 4.47 billion barrels in 2010.

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27 BP Statistical Review of World Energy, June 2010.

28 Worldwide look at Reserves and Production, Oil and Gas Journal, 1 January 2011.

Figure (2-6), shows the contribution of OAPEC members and other international groups in global oil reserves by 2010 end, while **Figure (2-7)** shows OAPEC members' proven reserves evolution between 2006 and 2010.

Figure 2-6

World Oil Reserves by International Grouping, End 2010
(Billion barrels)

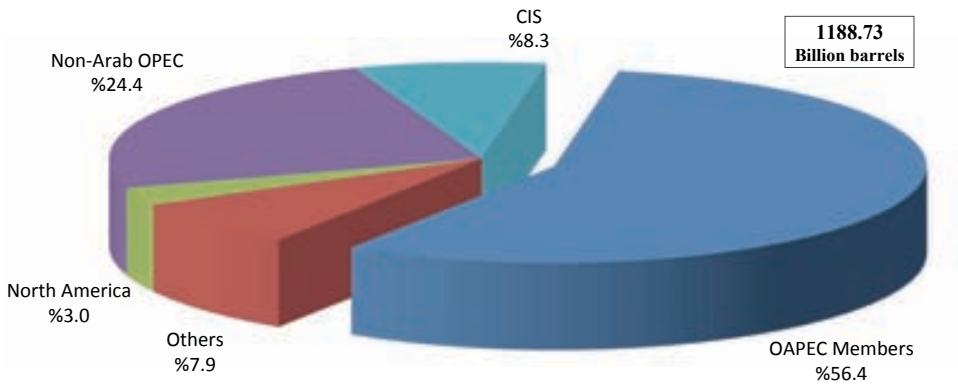
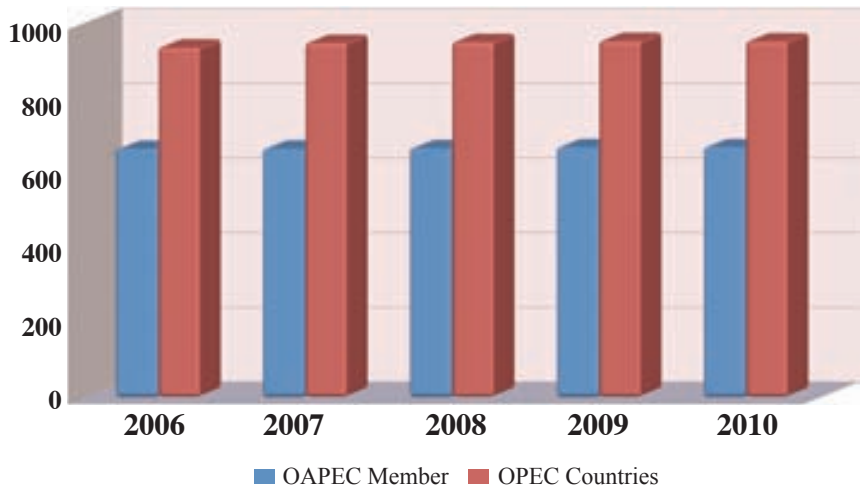


Figure 2-7

The Evolution of Oil Reserves in OAPEC and OPEC Member Countries, 2006- 2010
(Billion barrels at year end)



2-1-2 International Groups and other States:

Oil reserves estimates rose in many states like India, where reserves were increased by more than 57 million barrels to reach about 5.7 billion barrels in 2010. Reserves estimates increased in New Zealand and Thailand so that total reserves estimates in Asia states and Pacific touched 115 billion barrels. In Western Europe however, reserves dropped by over 1 billion barrels, this was mainly due to lower estimates of Denmark, France, Norway and United Kingdom. On the other hand, reserves estimates increased by some 53 million barrels in Italy and by 210 million barrels in Netherlands. Reserves of Turkey in turn, increased by no more than 8.2 million barrels.

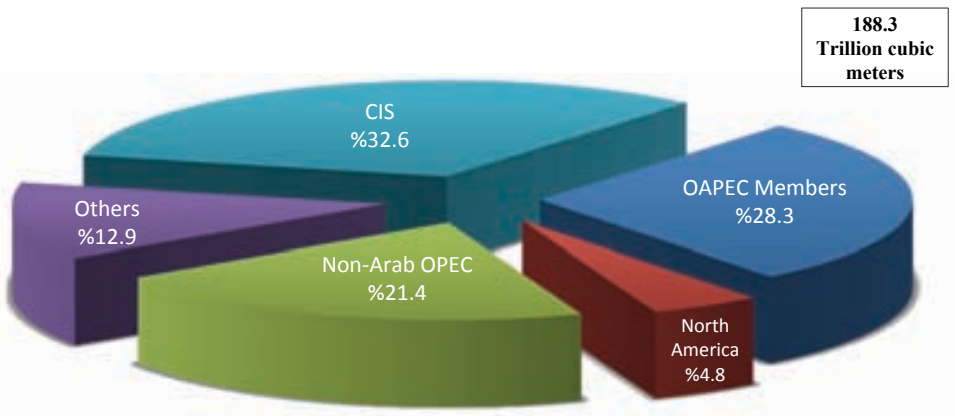
Estimations clearly increased in Africa by 1,645 million barrels, among which 645 million barrels came from Ghana. Western Hemisphere countries estimations have witnessed an increase of more than 708 million barrels resulted from new assessments in Brazil, Colombia, Mexico and Peru. **Table (2-4)**.

2-2 Natural Gas Reserves

Estimates for global natural gas reserves in 2010, reached more than 188.27 trillion m3, with a slight increase of 2009 estimates that reached 188.25 trillion m3. **Figure (2-8)** and **Table (2-5)**.

Figure 2-8

World Natural Gas Reserves, End 2010
(%)



2-2-1 OAPEC Members and Other Arab Countries

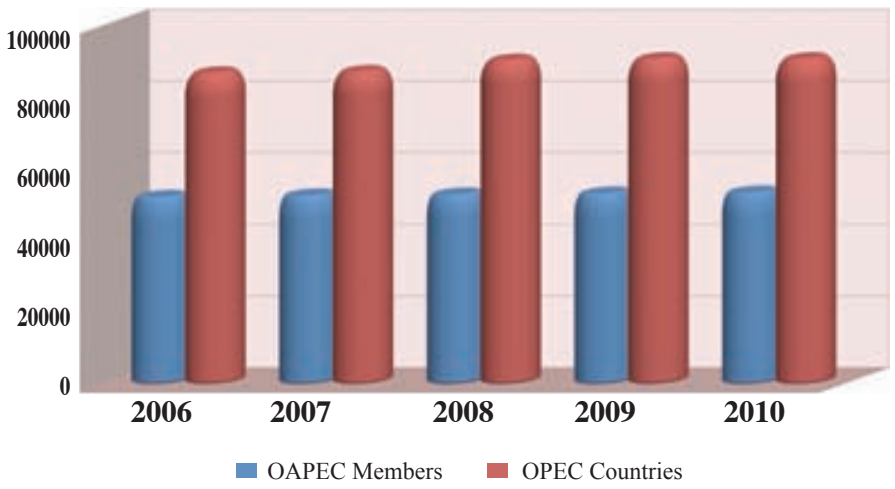
Gas reserves estimations of OAPEC members reached 53.3 trillion m^3 in 2010 comparing with 53 trillion m^3 in 2009, representing an increase of 0.5%. The raise came from boosting Egyptian reserves by 12.8% from 2,186 billion m^3 in 2009 to 2,466 billion m^3 in 2010.

OAPEC members' natural gas reserves in 2010 represented 28.3% of total world reserves, up from 28.2 % in 2009, while the Arab states together accounted for about 29.1% of world reserves at the end of 2010, comparing with 29% in 2009. It must be stressed that gas reserves in occupied Palestine have increased by 176.7 billion m^3 between 2009 and 2010 as a result of many significant discoveries achieved in last few years.

Figure (2-9) shows mainly the real evolution of natural gas reserves at OAPEC member countries and OPEC ones as well in the period 2006- 2010.

Figure 2-9

The Evolution of Natural Gas Reserves in OAPEC and OPEC Member Countries, 2006-2010 (Billion cubic meters at year end)



2-2-2 International Groups and Other States:

Natural gas estimates of the Commonwealth of Independent States remained the same as of 2009 at 61,301 billion m^3, representing 33% of the world natural gas reserves. OPEC members share of the world natural gas reserves increased from 49.6% in 2009 to 50.3% in 2010. China's natural gas reserves have increased by 0.2% from 3,030 billion m^3 in 2009, to 3,036 billion m^3 in 2010. Brazil's estimates have also increase from 364 billion m^3 in 2009 to 366 billion m^3 in 2010.

Generally speaking, natural gas reserves estimates have increased in the Middle East, Africa and the Western Hemisphere countries, whereas they slightly declined in Asia and Pacific by about 30 billion m^3 due to declined estimates of Thailand.

In Western Europe countries, natural gas reserves estimates of 2010 have sharply fallen by more than 348 billion m^3, this came due to the decline to the decline of Norway's estimations from 2312 billion m^3 in 2009 to 2038 billion m^3 in 2010. Natural gas reserves in the United Kingdom declined by more than 36 billion m^3 reaching 256 billion m^3 in 2010. In the Netherlands, estimated natural gas reserves have fallen by more than 28 billion m^3, they have declined in Denmark and Italy as well.

3. Hydrocarbon Liquids & Natural Gas Production

3-1 Hydrocarbon Liquid Production

Oil production covers both crude oil and condensates production, while hydrocarbon liquids production covers crude oil, condensates and natural gas liquids (NGLs) as well.

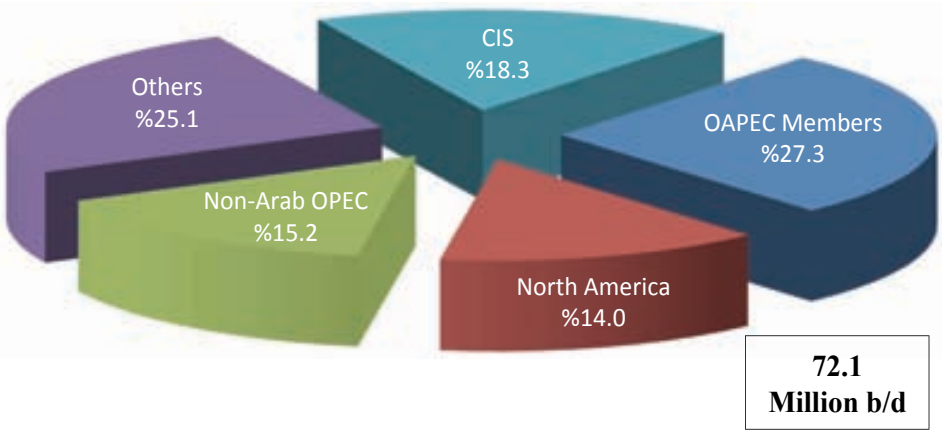
3-1-1 Oil Production

Estimations show that daily oil production at the global level has increased by 1.7% reaching 72.1 million b/d in 2010, comparing with about 70.9 million b/d in 2009.

Natural gas liquids production was estimated at about 9.3 million b/d in 2010, bringing total estimated production of hydrocarbon liquids in that year to about 81.4 million b/d, representing an increase of 1.5% from the estimates of 2009 amounted to about 80.2 million b/d. **Figure (2-10)** and **Table (2-6)**.

Figure 2-10

World Oil Production by International Grouping, 2010
(Million b/d)



3-1-1-1 OAPEC Members and Other Arab Countries

The available data indicate that oil production in member countries has slightly increased from 19.65 million b/d in 2009 to 19.70million b/d in 2010. For example, estimates show that the average production of the United Arab Emirates[29] increased from 2.24 million b/d in 2009, to 2.3 million b/d in 2010, the average production of Libya moved up by 0.9% from 1.47 million b/d in 2009 to 1.49 million b/d in 2010. Average oil production in Syria[30] increased by 3.2%, from 375,000 b/d in 2009 to 387,000 b/d in 2010. Daily oil production in Kuwait[31] increased from 2.26 million b/d in 2009 to 2.31 million b/d in 2010.

In Oman, oil production increase by 6% in 2010, reaching to 755,000 b/d, along with 88,000 b/d of condensate.

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29 Nine months average of 2010 according to JODI.

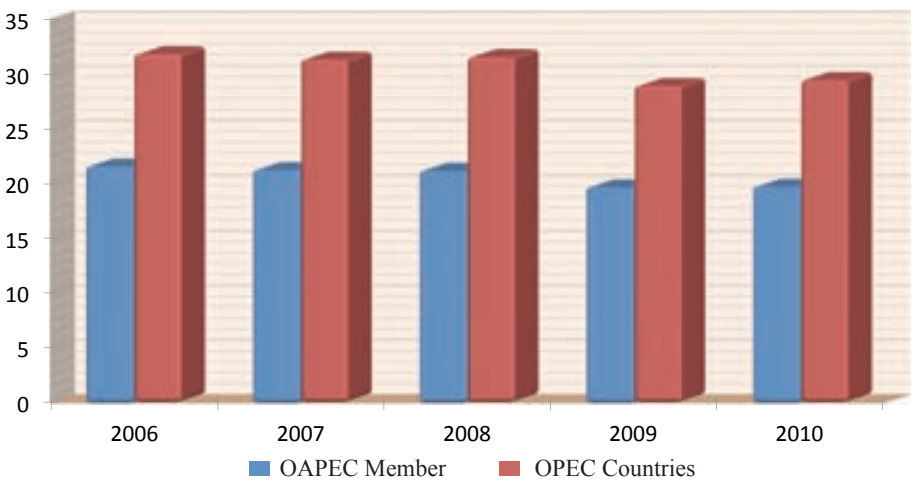
30 Nine months average of 2010 according to Syria oil and gas news website.

31 Eight months average of 2010 according to monthly data submitted to OAPEC.

On the other hand, oil production rated dropped in Egypt[32] from 564.3,000 b/d in 2009 to 554.3,000 b/d in 2010. Joint Oil Data Initiative (JODI) figures indicated some slight oil production decline in some other countries like Yemen which production decreased from nearly 284,000 b/d in 2009, to 275,000 b/d in 2010. **Figures (2-10)**, **(2-11)** and **Table (2-6)**.

Figure 2-11

Oil Production in OAPEC and OPEC Member Countries, 2006-2010
(Million b/d)



3-1-1-2 International Groups and other states

Estimates of oil production in the non-Arab OPEC countries increased from 10.48 million b/d in 2009, to about 10.97 million b/d in 2010, leading total OPEC production to an increase of 1.9% from

32 Energy data collecting form submitted to OAPEC, Egypt, 9/2/2011.

28.29 million b/d in 2009, to 29.47 million b/d in 2010. Thus, OPEC oil output[33] reached 40.9% of total world production in 2010, comparing with 40.8% in 2009.

Average production of the Commonwealth of Independent States increased by 4.4% from 12.66 million b/d in 2009 to 13.22 million b/d in 2010, that represents some 559,000 b/d, of which 314,000 b/d came from Kazakhstan and about 228,000 b/d from Russia.

Production rate increased in China by 247,000 b/d from 3.8 million b/d in 2009 to 4.05 million b/d in 2010. USA production increased as well by 3.3% from 5.3 million b/d in 2009 to 5.49 million b/d in 2010.

Meanwhile production rate declined in the U.K. by 7.5% to reach 1.19 million b/d in 2010 comparing with 1.29 million b/d in 2009. Oil production rate in Norway fell by 142,000 b/d down to 1.87 million b/d in 2010 comparing with over 2 million b/d in 2009.

3-1-2 NGL Production in OAPEC Members and the World

Estimates indicate that global production of natural gas liquids slumped by 0.5% from 9.22 million b/d in2008 to 9.18 million b/d in 2009. NGLs production in OAPEC member countries leveled up by 3.1% from 3.27 million b/d in 2008, to 3.37 million b/d in 2009. Natural gas liquids production in the Arab countries increased by 3.3% to reach 3.48 million b/d in 2009 comparing with 3.36 million b/d in 2008, contributed to the increase of Oman's NGLs production from 88,000 b/d in 2008 to about 100,000 b/d in 2009. Thus, the contribution of all

33 Indonesia is not included in OPEC anymore.

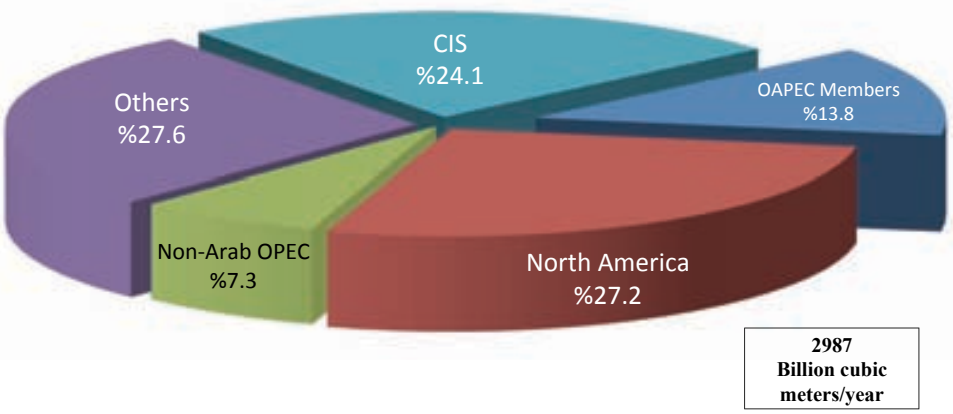
the Arab countries leveled up to 36.7% in 2009 from about 35.5% in 2008. **(Table 2-7)**.

3-2 Marketed Natural Gas

The quantities of natural gas marketed worldwide declined by 2.4 % from 3,060 trillion m^3 in 2008, to 2,987 trillion m^3 in 2009. **Figure (2-12)** and **Table (2-8)**.

Figure 2-12

Marketed Natural Gas by International Grouping, 2009 (%)



3-2-1 OAPEC Members and other Arab countries:

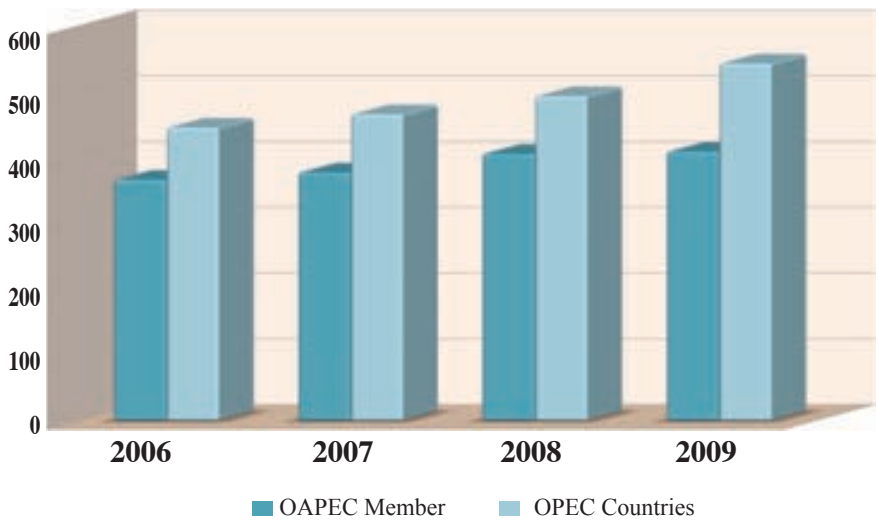
Marketed natural gas of OAPEC members rose from 407.6 billion m^3 in 2008 up to 410.9 billion m^3 in 2009 indicating rises in: Bahrain (0.8%), Tunisia (7.3%), Qatar (16%) and Egypt (1.8%), while the production level remained almost the same in Libya, and declined in other member countries. The marketed gas quantities declined in Oman by 2.8% from 25.2 billion m^3 in 2008, to 24.5 billion m^3 in 2009.

OAPEC total marketed natural gas increased from 13.3% in 2008

to 13.8 % in 2009, whereas total Arab marketed natural gas was 14.6% in 2009 comparing with 14.1% in 2008. **Figures (2-12)**, **(2-13)** and **Table (8-2)**.

Figure 2-13

Marketed Natural Gas in OAPEC and OPEC Member Countries, 2006-2009
(Billion cubic meter/year)



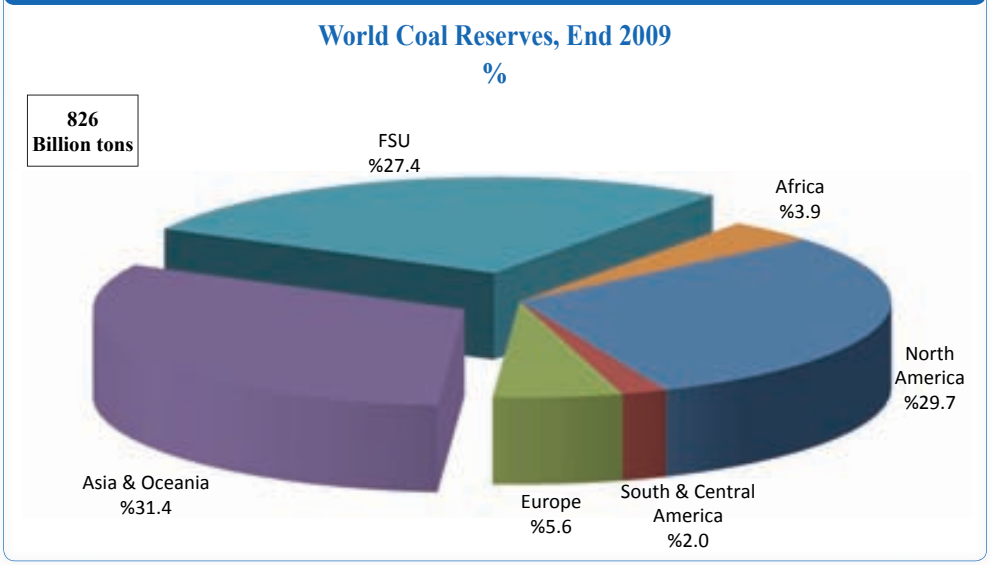
II. COAL

No significant changes were noticeable in coal reserves in 2009, reserves remained at 2008 levels of 826 billion tons, of which 411.3 billion tons were of Anthracite and 414.7 billion tons of Lignite. **Table (2-9)**.

The world's largest coal reserves are concentrated in North America, which accounted for about 29.6% of world reserves at the end of 2009,

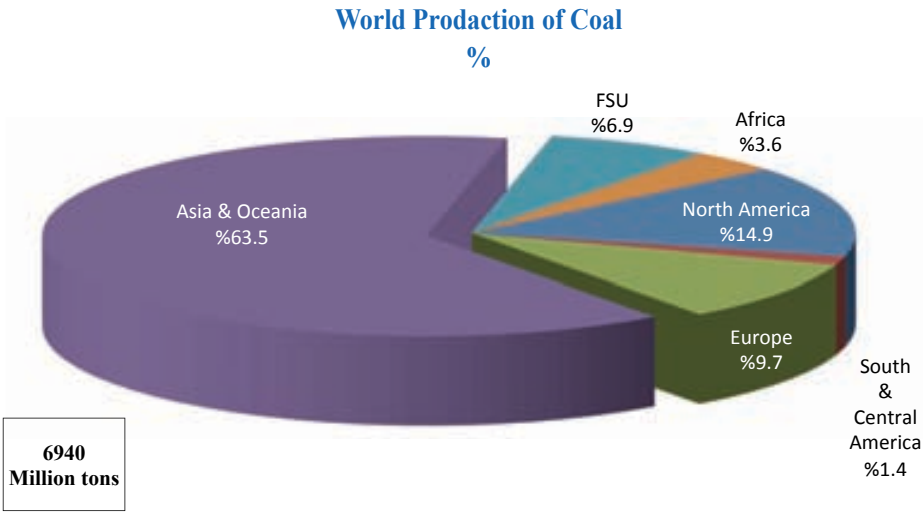
with the United States of America alone accounting for 28.8%, followed by FSU countries with 27.4%, China with 13.9%, Australia with 9.2%, and India with 7.1%. See **Figure (2-14)**.

Figure 2-14



World production of coal increased from about 679.3 billion tons in 2008 to 694 billion tons in 2009. China accounted for 3 billion tons 2009, or 43.9% of the world total production, followed by the United States of America with 973 million tons, or 14.02% of the world total, then India with 558 million tons, or 8.03%, next in line came Australia whose production increased from 389 million tons in 2008 to 409 million tons, then the Russian Federation who produced 298 million tons in 2009 comparing with 329 million tons in 2009. See **Table (2-10)** and **Figure (2-15)**.

Figure 2-15



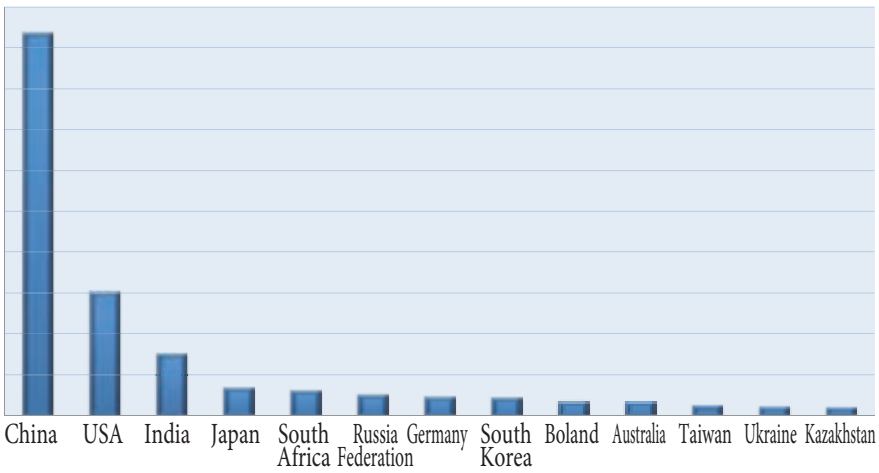
China has consumed about 47% of 2009 world coal production, followed by USA with 15.2%, then India who consumed 7.5%.

Chart C shows by- country coal consuming shares in 2009, countries that are not listed in this figure consumed less than 1% of the total world consumption each.

In the Middle East region, most of the coal consumption was in Algeria, Egypt, Iran and occupied Palestine. Collectively, they consumed less than 0.34% of total world consumption in 2009.

Chart C

By- Country Coal Consuming Shares in 2009



In its International Energy Outlook 2010 ,U.S .energy agency reported that coal continues to be the fuel most widely used for electricity generation in 2007 ,coal-fired generation accounted for 42% of world electricity supply ,of which 20.74% were in OECD and 21.81% in the rest of the world.

Coal-fired generation is believed to stay attractive ,particularly in nations that are rich in coal resources ,including China and India .World net coal-fired generation share is expected to reach 43% in 2035.

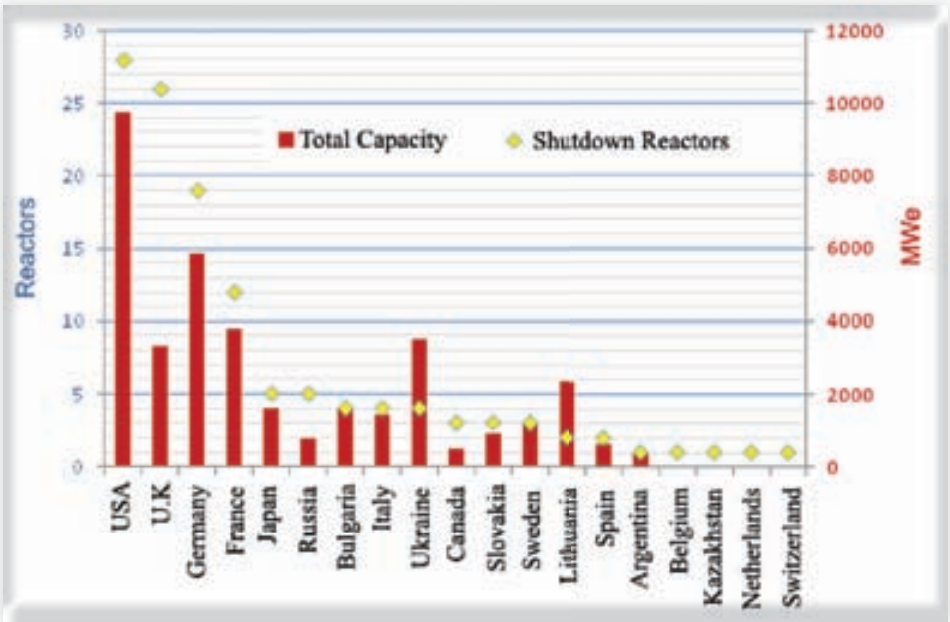
III. NUCLEAR ENERGY

By late 2010, the number of world operating nuclear reactors to generate electricity was 441 reactors, with an aggregate generating capacity of 374682 MWe, 5 more reactors were in the status of long-term Shutdown (4 in Canada and 1 in Japan), and another 125 reactors

were permanently shut down until 2010. **Table (2-11)**. Chart D shows the number of the shutdown reactors and their capacity, sorted by country[34].

Chart D

Shutdown Reactors and their Capacity



Moreover to say, 65 reactors are under construction in 16 countries worldwide, these are shown in table C[35].

34 IAEA, Shutdown Reactors, 12/7/2010.

35 IAEA, Nuclear Power Planet Information, updated to 12/7/2010

Table C

Under- Construction Reactors Sorted by Capacity

Country	Capacity MWe	No. of Reactors	% of Aggregate Capacity
China	26230	26	42.25
Russian Federation	9153	11	14.74
South Korea	5560	5	8.96
India	3786	6	6.10
Japan	2650	2	4.27
Taiwan	2600	2	4.19
Bulgaria	1906	2	3.07
Ukraine	1900	2	3.06
Fenland	1600	1	2.58
France	1600	1	2.58
Brazil	1245	1	2.01
USA	1165	1	1.88
Iran	915	1	1.47
Slovakia	782	2	1.26
Argentina	692	1	1.11
Pakistan	300	1	0.48
Total	62084	65	100.00

Among the reactors mentioned in Table C, it must be said that construction of 14 of them started in 2010, those are shown in Table D[36].

36 IAEA, Power Reactor Information System, Construction initiation, 2010 Highlights.

Table D

Reactors which Under- Construction Started in 2010

Country	Reactor	Capacity MWe	Official start date
China	Ningde 3	1000	8/1/2010
	Taishan 2	1700	15/4/2010
	Changjiang 1	610	25/4/2010
	Haiyang 2	1000	21/6/2010
	Fangchenggang 1	1000	30/7/2010
	Ningde 4	1000	29/9/2010
	Yangjiang 3	1000	15/11/2010
	Changjiang 2	610	21/11/2010
Russia	Leningrad 2-2	1085	15/4/2010
	Rostov 4	1011	16/6/2010
Japan	Ohma	1325	7/5/2010
Brazil	Angra 3	1245	1/6/2010
India	Kakrapar 3	640	22/11/2010
	Kakrapar 3	640	22/11/2010
Total	14 reactors	13866	

Five new reactors in 4 countries were connected to the grid in 2010, as shown in Table E[37]:

37 IAEA, Power Reactor Information System, New connection to the grid, 2010 Highlights.

Table E

Worldwide Reactors Connected to the Grid in 2010

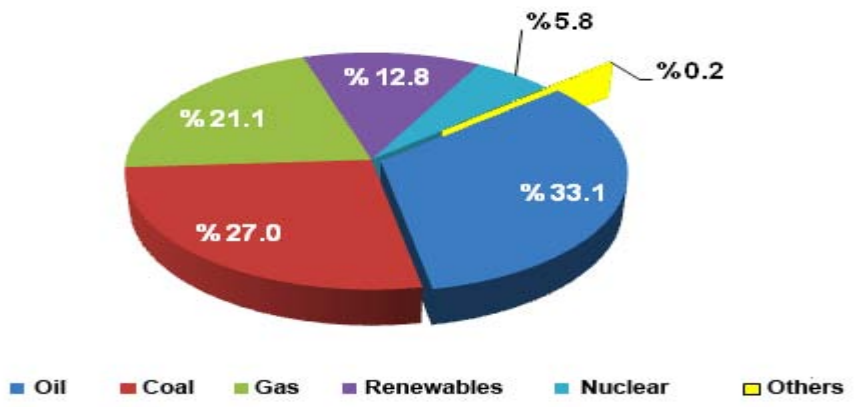
Country	Reactor connected	Capacity MWe	Date
China	Lingao 3	1000	15/7/2010
	Qinshan 2-3	1000	1/8/2010
Russia	Rostov 2	950	18/3/2010
India	Rajasthan 6	202	28/3/2010
South Korea	Shin Kori 1	950	4/8/2010
Total	5 reactors	4102	

IV. RENEWABLE ENERGY SOURCES

In 2008, energy generated at the global level was about 12267 million toe[38], of which the share of renewable energy resources reached 12.8%, i.e. 1567 million toe, Chart E shows these shares in details[39].

Chart E

Shares of Renewables in Total Energy Generated in 2008



38 Tons of Oil Equivalent.

39 IEA, Renewables Information, 2010 Edition.

Among the other resources of renewables, biofuel came first with a share of 76.7%, followed by hydropower with 17.6%, geothermal with 3.7%, wind energy with 1.2% and solar energy and ocean and tidal power with a shar of 0.8%.

The Arab region is characterized by the presence of abundant quantities of fossil fuels, however, renewables are getting more focus recently.

Due to the civilization development in the region, electricity consumption has increased dramatically, and so has the establishment of power stations. However, the lack of electricity in remote areas, led some states and governments to consider renewable energy sources, especially wind and solar energy. Renewable energy sources include hydroelectricity, solar, wind, geothermal, biomass, ocean, and tidal energy. Among developments in this field, reference can be made to "Shams-1" Project in United Arab Emirates. Launched in mid 2010 by the Abu Dhabi Future Energy Company (Masdar)[40], with initial cost of AED 2.2 billions, the aim of the project is to provide 7% of Abu Dhabi needs of electricity in 2020, where Shams 1 will have a capacity of 100 megawatts, which makes it the largest parabolic trough power station in the world, and the first of kind in the Middle East region.

Shams solar power station is a planned concentrating solar power station in Madinat Zayed (Zayed City), 120 km to the south west of Abu Dhabi, it will occupy approximately 2.5 square km, the plant will be equipped with 768 parabolic mirrors, it is expected to be ready by 2013. It is noteworthy that this project falls within the framework of the projects of the Clean Development Mechanism (CDM) of the United

40 UAE Ministry of Energy, official website, 10/6/2010

Nations, as it is expected to contribute to the reduction of 175,000 tons per year of carbon dioxide (CO2) emission.

In Syria, The ministry of electricity plans to build wind farm to generate electricity on the shores of "Lake Katina" in Homs governorate, where the area is characterized by wind speed of about 8 meters per second, with 3,000 hours per year of wind. The project is expected to contribute more than 20 megawatts of electricity. The ministry of electricity has announced two locations for the implementation of wind farms dedicated to the private sector, first in the city of Sukhna in the province of Homs, and the second near the capital Damascus.

Kuwait in turn is preparing a comprehensive plan to benefit from the renewable energy, where according to the Secretary General of the Kuwaiti Development of Renewable Energy, Kuwait began to conduct experiments and small projects in this area, particularly in the northern regions of the country, she noted that the government plans to build 15 new schools supplied with electricity generated from renewable energy, as well as planning for the establishment of official buildings that rely on this kind of energy in terms of heating, cooling and general operation of the electricity supply[41].

In Egypt, solar energy provided light to two villages "Um Al Sageer" and "Ein Zuhra". This came in the framework of cooperation between the ministry of environment and lands of Italy, and the new and renewable energy authority (NERA) of Egypt, with an Italian grant of three million Egyptian Pound (LE)[42]. The project is part of a plan to provide lighting to a number of remote villages that are far from the electric grid.

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41 AL Siyasah Newspaper, 16/10/2010

42 Egypt State Information Service, website, 18/12/2010

In addition, 2011 will see the operation of the first plant to generate electricity using solar thermal energy in integration with combined cycle in the "Kremat" area. The project which is considered a pioneer one in the world has a capacity of 140 MW of which 20 megawatts will be generated of solar energy. Preparations are under way to establish a new solar power plant in the "Kom Ombo" in Upper Egypt with a capacity of 100 MW, and another plant of photovoltaic cells in "Hurghada" with a capacity of 20 MW, this comes as a part of a plan extending between 2012 and 2017. It is noteworthy that Egypt has announced by late 2010 the hosting of the Regional Centre for Renewable Energies and Energy Efficiency "RCREEE". The centre formulates and disseminates policies in support of renewable energy and energy efficiency and provides a platform for the regional exchange on policy issues and technological questions. RCREEE has ten rich- in renewable energy founding members, including Algeria, Tunisia, Syria, Libya, Egypt, Jordan, Lebanon Morocco, Palestine and Yemen.

In Morocco, the first green- city project was inaugurated 20 km to the south of Casablanca (Sahl Al Khyayta), it is planned to be self-sufficient in energy by using wind power and solar energy, 30 electricity generation facilities are planned to be constructed to generate electricity from wind, with a capacity up to 100 MW, in addition to the use of photovoltaic cells on the walls and roofs of buildings, construction work in said city is expected to start within 2011.

1. Hydropower

1-1 Hydropower in the World

According to the World Energy Council (WEC) 180 countries are utilising hydropower resources to generate electricity, the total installed hydropower capacity in the world reached about 874 GW in 2008, of which 35% was in Asia, 25% in Europe, 19% in North America, 15% in South America, 3% in Africa, 2% in South Pacific and only 1% in the Middle East.

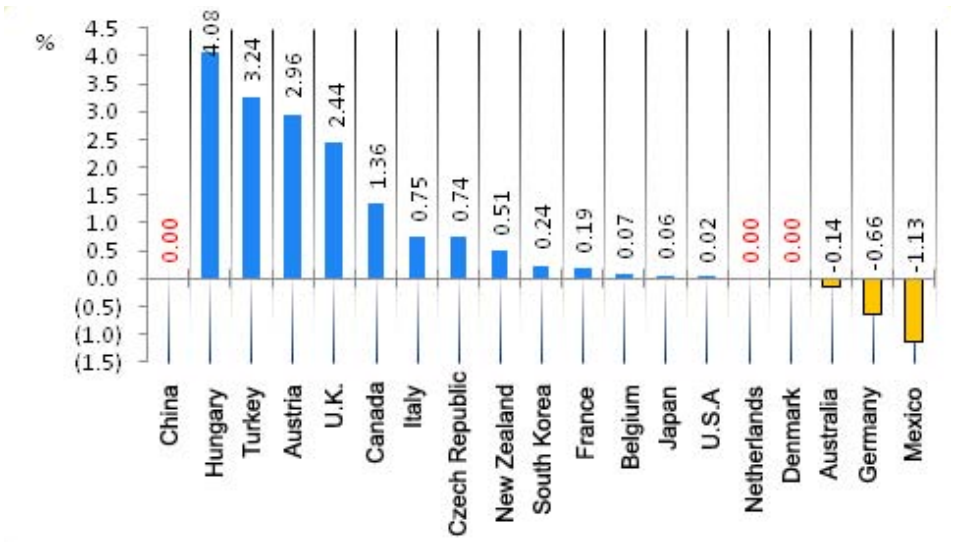
In this regard, China ranked first, where its total installed hydropower capacity reached 147.8 GW by end of 2008, USA came second with about 99.8 GW, compared with 99.7 GW in 2007, Canada came third with total installed hydropower capacity of 74.6 GW in 2008, compared with 73.6 GW in 2006. In Japan, total installed hydropower capacity amounted to 47.34 GW in 2008, as for France, the total installed hydropower capacity was 25.17 GW in 2008. Total installed hydropower capacity in Mexico reached about 11.4 GW in 2008, compared with 11.5 GW in 2007, with a decline of 1.13%.

In Turkey, total installed hydropower capacity increased from 13.39 GW in 2007, to 13.82 GW in 2008, with annual growth rate of (3.24%). Total installed hydropower capacity in UK rose by annual growth rate of (2.44%) from 4269 MW in 2007, to 4373 MW in 2008. On the other hand, total installed hydropower capacity declined in Germany from 10067 MW in 2007 to 10001 MW in 2008. **Table (2-12)** shows the total installed hydropower capacity in some countries.

Generally speaking, total installed hydropower capacity in China, Netherlands and Denmark remained unchanged between 2007 and 2008, but fell it down in Australia, Germany and Mexico. Total installed hydropower capacity increased in some other countries of the world. Chart F illustrates some of these changes.

Chart F

Ration of Change of Total installed Hydropower Capacity in Some Countries between 2007 and 2008



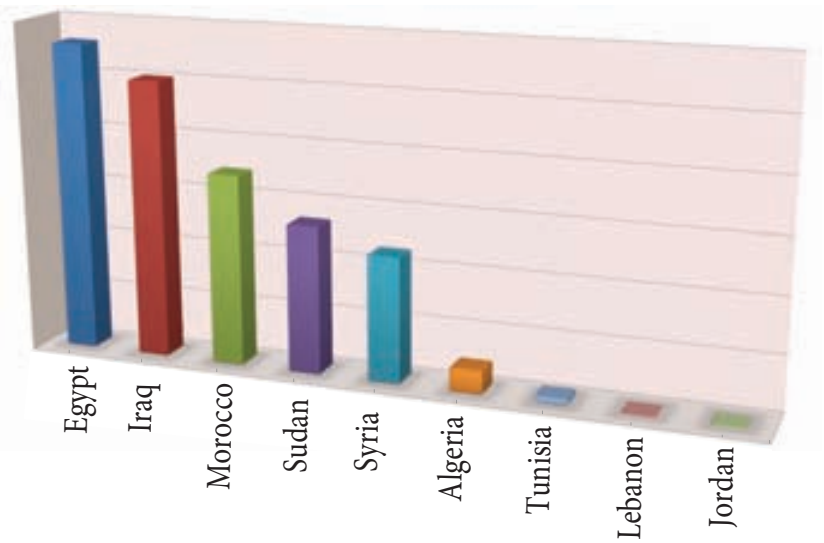
1-2 Hydropower in the Arab Countries

Arab countries with available hydropower resources exploit them for electricity generation, especially Algeria, Syria, Iraq and Egypt and some other countries. Chart G shows the installed hydropower capacity in some of these countries[43], noting that Sudan has officially inaugurated the Dam of Marwa in 2009 which capacity is 1250 MW.

43 Arab Union of Producers, Transporters and Distributors of Electricity, Statistics, 2009.

Chart G

Installed hydropower capacity in some Arab countries in 2008



2. Wind Energy

2-1 Wind Energy in the World

BP statistical review of world energy[44] of 2008 indicated that total installed wind power capacity in the world reached 122158 MW. Europe came first with 47.8% of total installed capacity in 2009, followed by North America with 24.3% then Asia and Pacific with 26.3%. See **Table (2-13)**.

By 2009, total installed wind power capacity in the 27 countries of the EU generated 4.8% of its electricity need, where ten turbines with a capacity of 10 GW were installed during the year, 2.8% of which are located in offshore wind farms. Table (F) show the top 10 capacities installed in the world in 2009.

44 British Petroleum, Statistical Report of World Energy, 2010.

Table F

Top 10 Capacities Installed in the World in 2009.

Country	Installed Capacity MW	%
China	13000	34.7
USA	9,922	26.5
Spain	2,459	6.6
Germany	1,917	5.1
India	1,271	3.4
Italy	1,114	3
France	1,088	2.9
The U.K.	1,077	2.9
Canada	950	2.5
Portugal	673	1.8
Rest of the world	3,994	10.7
Total world	**37,466**	100

European Wind Energy Association stated that 118 wind turbines of offshore wind farms were connected to the grid in mid 2010, the turbines have a total capacity of about 333 MW. Statistics of the named association showed that by mid 2010, the number of wind turbines operating in the European Countries was 948 distributed among 43 offshore wind farms, with a total capacity of 2396 MW. Chart (H) shows the order of some of the countries in terms of total wind power capacity installed.

Chart H

Total Installed Wind Power Capacity in Some Countries by 2009

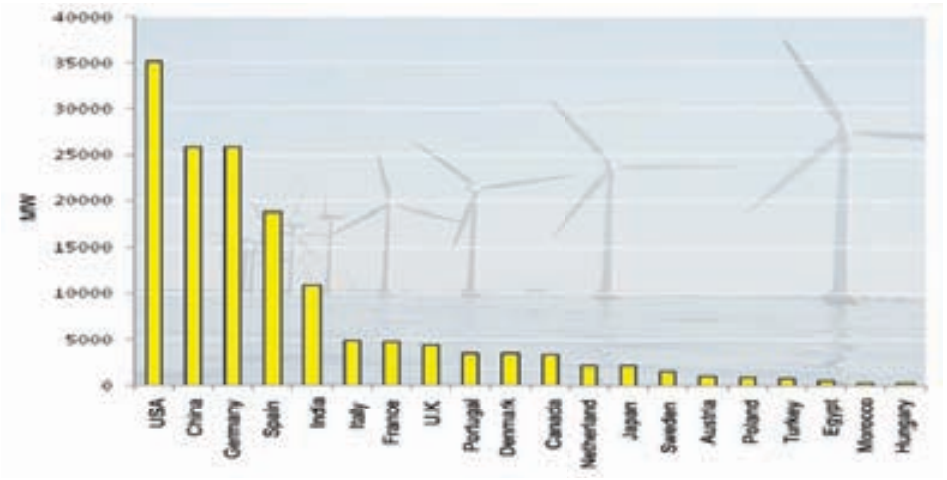
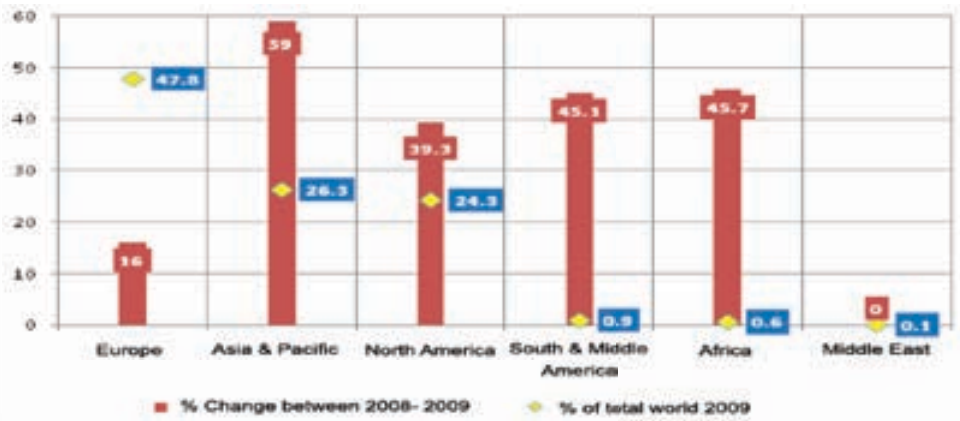


Chart (I) shows the ratio of installed wind power capacity in different regions of the world to the total world, it also shows the change in installed wind power capacity in these regions between 2008 and 2009.

Chart I

The Ratio of Installed Wind Power Capacity in Different Regions of the World to the Total World, and the Change in Installed Wind Power Capacity in These Regions Between 2008 and 2009



2-2 Wind Energy in the Arab Countries

According to BP statistics, total installed wind power capacity in 2008 reached 384 MW in Egypt and 206 MW in Morocco. WEC[45] estimated that total installed wind power capacity in Jordan was 1 MW in 2008.

GWEC[46] estimated that total installed wind power capacity in Tunisia was about 20 MW in 2008, thus, these total installed capacities represent no more than 0.5% of total installed wind capacity in the world.

However, total installed wind power capacity in 2009 increased to 552 MW in Egypt (i.e. an increase of 43.8% comparing with 2008), and to 254 MW in Morocco (i.e. an increase of 23.3% comparing with 2008).

World Energy Council also estimated that total installed wind power capacity in the Middle East was 81 MWe in 2008, 74 MWe of which was in Iran. Electricity generated of this capacity reached 159 GWh, of which 3 GWh in Jordan, and 1 GWh in Syria.

3. Solar Energy

3-1 Solar Energy in the World

According to IEA statistics, the accumulated installed photovoltaic capacity worldwide stood at about 22928 MW by 2009. Germany was the world leader in using photovoltaic cells, with a cumulative installed capacity of about 9677 MW in 2009, with a growth rate of 64.7% between 2008 and 2009. Spain came second in rank with a cumulative installed capacity of 3423 MW. Japan followed with a capacity of 2628.2 MW

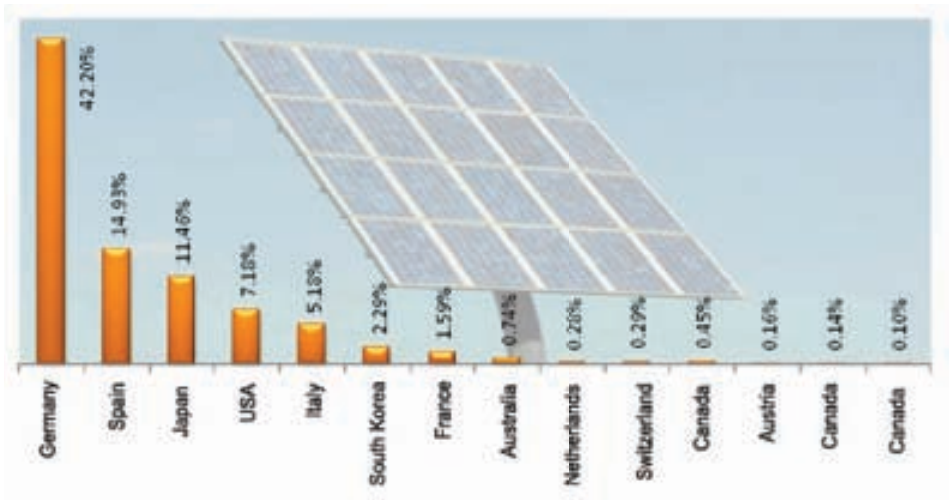
45 Survey of energy resources, World Energy Council, 2010.

46 Global Wind Energy Council, 2010.

in 2009, and the United States of America came in the fourth rank with a capacity of 1645.5 MW as shown in **Table (2-14)**. Chart (J) shows the order of some of the countries in proportion to the total cumulative installed photovoltaic capacity in the year 2009.

Chart J

The Order of Some Countries in Proportion to the Total Cumulative Installed Photovoltaic Capacity in the Year 2009



3-2 Solar Energy in the Arab Countries

Solar energy is available in the Arab countries at higher rates comparing to other parts of the world, Jordan for example has abundance of solar energy with a daily average solar irradiance of 7 kWh/m^2, and has 330 sunny days per year.

Some Arab countries utilize and encourage this type of energy, like Bahrain who started using solar energy through solar cells to generate electricity for buildings such as the European University in Bahrain. University of Bahrain has also concluded a contractual project with

Banagas for the design and production of mobile power plant working by sun and wind, which can be suitable for generating electricity for remote areas, this plant produces about 1.9 kW of electricity from the sun and 100 kW of wind power.

Syria has plans to provide the youth housing project with solar water-heaters, where the number of apartments subscribed to by the youth is expected to reach more than 50,000 apartments in 2012. Syria also aims- through the National Centre for Energy Research- to broaden the use of solar energy for water heating, and to facilitate the acquisition of necessary equipment in order to open the door for offering them to all official employees, where every employee can have a 3 years- no-interest loan equivalent to the value of the device. Syria also worked on the implementation of the first pilot project in the field of solar water heating in Al Waleed governmental hospital in the city of Homs at the end of 2006.

Another example comes from the mountainous regions of southern and western Saudi Arabia, a project aims to provide 93.8 kW of solar energy for the lighting of 13 tunnels. The cost of the project is expected to reach SR 20 million. In mid-2009, Saudi Aramco signed a memorandum of understanding with the Japanese Showa Shell Company to study a solar energy project in the kingdom to build small-scale facilities to provide electricity to local communities.

4. Geothermal Energy

4-1 Geothermal Energy in the World

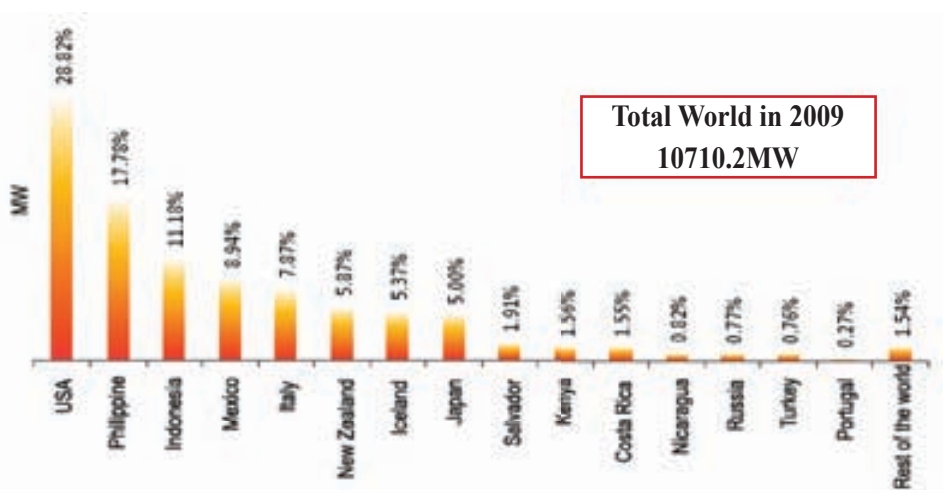
Using geothermal energy to generate electricity has witnessed no significant changes between 1990 and 2009. The growth rate of using

this type of energy in electricity-generation has increased by merely 2% during that period[47]. Geothermal energy participated in generating 26.6 TWh in 1990, and 42 TWh in 2009.

According to BP statistics, the installed geothermal capacity in the world reached 10710.2 MW in 2009, compared with 10313.1 MW in 2008 (i.e. an annual increase of 3.9%). Chart (K) show the ratio of geothermal energy used in the world. **Table (2-15)**.

Chart K

The Ratio of Installed Geothermal Capacities Used in the World in 2009



4-2 Geothermal Energy in the Arab Countries

Geothermal energy resources discovered in Arab countries are still limited and geological surveys operations are not yet completed. However, there are limited unexploited potentials in each of Egypt, Jordan, Yemen, Syria, Saudi Arabia, Morocco, Tunisia and Algeria that had not been exploited so far.

47 IEA, Development of renewables and waste in OECD countries, Renewables Information, 2010.

In this regard, reference can be made to an attempt in Ramallah in occupied Palestine[48], Al Etihad Compound Project involved the building of 62 villas on an area of 2400 m^2, ten wells were drilled to a depth of 70 m each, geothermal energy exploited from the wells generated 23 kW of electricity that operated the heating and cooling systems of the project. This has contributed to reduction in the cost of operating these systems from $ 3300/year to $ 850/year, a reduction of approximately 70%.

5. Solid Biomass Energy

5.1 Solid Biomass Energy in the World

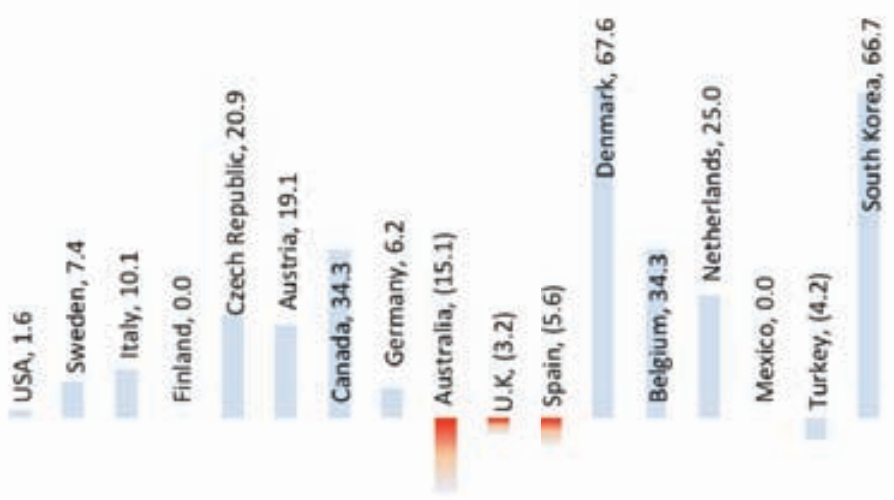
According to IEA Statistics, the installed biomass energy capacity in its member countries totaled 125.6 TWh in 2009, that is about 7.1% of the total electricity generated from renewables in that year. USA ranked first in installed solid biomass capacity, with about 7172 MW in 2008. As for the rate of growth of the installed biomass energy capacity between 2007 and 2008, Denmark came first with 67.6%, followed by South Korea with 66.7%.

Chart (L) shows the order of some member countries of IEA, where it is clear that installed capacity in some of them did not change between 2007 and 2008 (Finland and Mexico), while it declined in Australia, UK, Spain and Turkey, installed biomass energy capacity increased in the remaining countries. **Table (2-16)** shows the total installed biomass energy capacity in some countries between 2007 and 2008.

48 Technical and economic energy developments in Palestine, a paper submitted to the ninth Arab energy conference, Qatar, 2010.

Chart L

Growth Rate of Installed Biomass Energy Capacity Between 2007 and 2008



5.2 Solid Biomass Energy in the Arab Countries

Solid biomass energy is used in primitive manner in the Arab countries for cooking and heating, this is clear particularly in remote areas. However, these resources are relatively limited due to the semi-arid nature of most lands. Agricultural, animal and timber waste are the main source of biomass.

6. Ocean and Tidal Power

Using ocean and tidal power energy has contributed to the generation of 542 GWh in 2009, France accounted for 491 GWh using tidal power, Canada generated 33 GWh and the U.K. generated 18 GWh. According to IEA statistics, total installed ocean and tidal power energy in its member countries was 261 MW in 2008 with no change from the previous years, France accounted for 240 MW, Canada 20 MW and the U.K. accounted for 1 MW.

TABLES
OF CHAPTER TWO

Table 2-1
Seismic Surveys Worldwide, 2006-2010
(Crew /Month)

	2006	2007	2008	2009	2010
Canada	20	17	17	10	9
USA	61	71	72	63	63
Latin America	22	29	32	35	40
Europe	14	23	34	32	30
CIS	36	42	48	45	47
Middle East	15	18	29	34	33
Africa	40	56	63	72	71
Far East	42	42	61	70	68
World total	**250**	**298**	**356**	**361**	**361**

Sources:
- OAPEC Data Bank.
- World Oil, Several issuse, Jan. - Nov. 2010.

Table 2-2
Average Number of Active Rigs Worldwide, 2006-2010
(Rig)

	2006	2007	2008	2009	2010
Canada	470	346	379	206	346
USA	1648	1769	1878	1075	1525
Latin America	324	354	384	356	383
Europe	77	78	98	84	93
Middle East	238	265	280	252	265
Africa	58	66	65	62	83
Asia/Pacific	228	241	252	243	268
World total	**3043**	**3119**	**3336**	**2278**	**2963**

Sources:
- OAPEC Data Bank.
- Baker Hughes, Dec. 2010.

Table 2-3
Petroleum Discoveries in OAPEC Members and Other Arab Countries, 2006-2010

	2006		2007		2008		2009		2010*	
	Oil	Gas	Oil	Gas	Oil	Gas	Oil	Gas	Oil	Gas
Algeria	12	7	5	15	2	9	4	12	3	10
Bahrain	-	-	-	-	-	-	-	-	-	-
**Egypt	29	22	9	7	37	24	40	24	41	22
Iraq	1	-	-	-	-	-	3	1	1	1
Kuwait	1	-	1	-	-	-	1	-	-	-
Libya	7	3	5	2	8	-	6	-	6	1
Qatar	-	-	-	-	-	-	-	-	-	-
Saudi Arabia	-	2	2	-	-	-	5	5	-	1
Syria	-	1	1	1	2	-	5	1	2	-
Tunisia	4	1	3	-	2	2	1	-	1	4
UAE	-	-	-	-	-	-	1	-	1	-
Total OAPEC	**54**	**36**	**26**	**25**	**51**	**35**	**66**	**43**	**55**	**39**
Oman	-	-	-	-	3	1	5	-	1	2
Sudan	4	-	-	-	-	-	-	-	-	-
Morocco	-	-	-	-	-	1	-	3	-	1
Yemen	5	1	-	-	1	-	9	1	-	-
Total Arab countries	**63**	**37**	**26**	**25**	**55**	**37**	**80**	**47**	**56**	**42**

* Preliminary estimates.
** Official sources.

Sources:
- OAPEC Data Bank.
- Energy Resources Monitor, OAPEC, Several issues, 2010.

Table 2-4
Arab and World Oil Reserves, 2006-2010
(Billion barrels at year end)

	2006	2007	2008	2009	2010*	(%) Change 2010/2009
Algeria	12.20	12.20	12.20	12.20	12.20	0.0
Bahrain	0.12	0.13	0.12	0.12	0.12	0.0
Egypt**	3.72	3.86	4.19	4.41	4.47	1.4
Iraq	115.00	115.00	115.00	115.00	115.00	0.0
Kuwait	101.50	101.50	101.50	101.50	101.50	0.0
Libya	41.46	43.66	44.27	46.42	46.42	0.0
Qatar	26.19	25.09	25.41	25.38	25.38	0.0
Saudi Arabia	264.25	264.21	264.06	264.59	264.59	0.0
Syria	3.00	2.25	2.25	2.25	2.25	0.0
Tunisia	0.40	0.37	0.43	0.43	0.43	0.0
UAE	97.80	97.80	97.80	97.80	97.80	0.0
Total OAPEC	**665.64**	**666.07**	**667.23**	**670.10**	**670.16**	**0.01**
Oman	5.70	5.70	5.50	5.50	5.50	0.0
Sudan	5.00	5.00	5.00	5.00	5.00	0.0
Yemen	3.00	3.00	3.00	3.00	3.00	0.0
Total Arab countries	**679.34**	**679.77**	**680.73**	**683.60**	**683.66**	**0.01**
Angola	9.33	9.50	9.50	9.50	9.50	0.0
Ecuador	5.18	6.37	6.51	6.51	6.51	0.0
Iran	138.40	136.15	137.62	137.62	137.01	(0.4)
Nigeria	37.20	37.20	37.20	37.20	37.20	0.0
Venezuela	87.32	99.38	99.40	99.40	99.40	0.0
Total non-Arab OPEC	**277.43**	**288.60**	**290.23**	**290.23**	**289.62**	**(0.2)**
Total OPEC	**935.83**	**948.06**	**950.47**	**953.12**	**952.51**	**(0.1)**

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Table 2-4 Cont.

	2006	2007	2008	2009	2010*	(%) Change 2010/2009
Brazil	11.77	12.18	12.62	12.80	12.86	0.5
Canada	6.01	5.39	4.94	6.10	6.10	0.0
China	16.30	16.30	16.30	20.35	20.35	0.0
CIS	107.99	100.68	98.80	98.90	98.90	0.0
Of which: Azerbaijan	7.00	7.00	7.00	7.00	7.00	0.0
Kazakhstan	39.80	30.00	30.00	30.00	30.00	0.0
Russian Federation	60.00	60.00	60.00	60.00	60.00	0.0
Turkmenistan	0.60	0.60	0.60	0.60	0.60	0.0
Uzbekistan	0.59	0.59	0.59	0.59	0.59	0.0
Mexico	12.35	11.65	10.50	10.40	10.40	0.0
Norway	7.85	6.87	6.68	6.68	5.67	(15.1)
UK	3.87	3.60	3.41	3.08	2.86	(7.1)
USA	21.76	20.97	21.32	19.12	19.12	0.0
Rest of the world	6.88	24.83	23.55	33.83	39.19	15.8
World total	**1151.56**	**1170.84**	**1169.08**	**1185.09**	**1188.73**	**0.3**
(%) OAPEC/ world	**57.8**	**56.9**	**57.1**	**56.5**	**56.4**	
(%) Arab countries/ world	**59.0**	**58.1**	**58.2**	**57.7**	**57.5**	
(%) OPEC/ world	**81.3**	**81.0**	**81.3**	**80.4**	**80.1**	

* Preliminary estimates.
** Official sources.

Notes: Parentheses denote negative figures.
- Total world reserves excluding :
A - Bitumen and extra heavy oil in Venezuela (111.8 billion barrels).
B - Unconventional reserves of Canada such as the oil sands estimated by BP at about (27 billion barrels).
- 50% of the Divided Zone›s oil reserves is added to each of Saudi Arabia and Kuwait oil reserves.
- Indonesia›s oil reserves are not included in OPEC figures.

Sources:
- OAPEC Data Bank.
- BP Statistical Review of World Energy, June 2010.
- Oil & Gas Journal, 1 Jan. 2011.
- OPEC Annual Statistical Bulletin, 2009.

Table 2-5
Arab and World Natural Gas Reserves, 2006-2010
(Billion cubic meters at year end)

	2006	2007	2008	2009	2010*	(%) Change 2010/2009
Algeria	4504	4504	4504	4504	4504	0.0
Bahrain	92	92	92	92	92	0.0
Egypt**	1910	2024	2152	2186	2466	12.8
Iraq	3170	3170	3170	3170	3170	0.0
Kuwait	1780	1784	1784	1784	1784	0.0
Libya	1420	1540	1540	1549	1549	0.0
Qatar	25636	25636	25466	25366	25366	0.0
Saudi Arabia	7153	7305	7570	7920	7920	0.0
Syria	290	290	285	285	285	0.0
Tunisia	64	55	65	65	65	0.0
UAE	6040	6072	6091	6091	6091	0.0
Total OAPEC	**52059**	**52472**	**52719**	**53012**	**53292**	**0.5**
Oman	914	950	950	950	950	0.0
Sudan	86	85	85	85	85	0.0
Yemen	515	555	479	479	479	0.0
Total Arab countries	**53574**	**54062**	**54233**	**54526**	**54806**	**0.5**
Angola	270	270	272	310	310	0.0
Ecuador	9	9	8	8	8	0.0
Iran	26850	26850	29610	29610	29610	0.0
Nigeria	5207	5292	5292	5292	5292	0.0
Venezuela	4708	4708	4983	5065	5065	0.0
Total non-Arab OPEC	**37044**	**37129**	**40165**	**40285**	**40285**	**0.0**
Total OPEC	**86747**	**87140**	**90290**	**90669**	**90669**	**0.0**

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Table 2-5 Cont.

	2006	2007	2008	2009	2010*	(%) Change 2009/2010
Brazil	303	348	365	364	366	0.5
Canada	1622	1648	1640	1754	1754	0.0
China	2449	2272	2265	3036	3036	0.0
CIS	56171	57052	56458	61301	61301	0.0
Of which: Azerbaijan	840	849	850	850	850	0.0
Kazakhstan	3000	2832	2407	2407	2407	0.0
Russian Federation	47651	47572	47573	47573	47573	0.0
Turkmenistan	2860	2832	2662	7504	7504	0.0
Uzbekistan	1820	1841	1841	1841	1841	0.0
Mexico	408	392	373	360	339	(5.8)
Norway	2892	2241	2313	2313	2039	(11.8)
UK	476	412	343	292	256	(12.3)
USA	5925	5977	6732	6928	6928	0.0
Rest of the world	17456	11406	11475	17095	17160	0.4
World total	**178320**	**172939**	**176362**	**188254**	**188270**	**0.0**
(%) OAPEC/world	**29.2**	**30.3**	**29.9**	**28.2**	**28.3**	
(%) Arab countries/world	**30.0**	**31.3**	**30.8**	**29.0**	**29.1**	
(%) OPEC/world	**48.6**	**50.4**	**51.2**	**48.2**	**48.2**	

* Preliminary estimates.
** Official sources.
Notes:
- Parentheses denote negative figures.
- Indonesia's gas reserves are not included in OPEC figures.

Sources:
- OAPEC Data Bank.
- Oil & Gas Journal, 1 Jan. 2011.
- OPEC Annual Statistical Bulletin, 2009.

Table 2-6
Arab and World Hydrocarbon Liquids Production, 2006-2010
(Thousand b/d)
First : Crude Oil Production

	2006	2007	2008	2009	2010*	(%) Change 2009/2010
Algeria	1426.0	1398.0	1356.0	1216.0	1199.4	(1.4)
Bahrain**	183.3	184.3	182.2	182.4	181.1	(0.7)
Egypt**	554.0	562.0	528.2	564.3	554.3	(1.8)
Iraq	1952.2	2035.2	2280.5	2336.2	2340.0	0.2
Kuwait**	2644.5	2574.5	2676.0	2261.6	2310.6	2.2
Libya	1751.2	1673.9	1721.5	1473.9	1487.4	0.9
Qatar	802.9	845.7	842.8	733.0	726.0	(1.0)
Saudi Arabia	9208.0	8978.6	8532.0	8184.0	8135.4	(0.6)
Syria	377.1	370.0	390.0	375.1	387.0	3.2
Tunisia	96.5	70.0	85.0	82.0	81.7	(0.4)
UAE	2568.0	2529.0	2572.2	2241.6	2304.0	2.8
Total OAPEC	**21563.7**	**21221.2**	**21166.4**	**19650.1**	**19706.9**	**0.3**
Oman	687.1	651.0	672.0	712.0	755.0	6.0
Sudan	356.1	483.1	457.0	475.2	480.0	1.0
Yemen	365.7	319.6	293.5	284.1	275.0	(3.2)
Total Arab countries	**22972.6**	**22674.9**	**22588.9**	**21121.4**	**21216.9**	**0.5**
Angola	1391.8	1626.0	1896.3	1738.9	1739.0	0.0
Ecuador	536.5	510.0	501.4	464.7	473.3	1.9
Iran	4072.6	4013.0	4055.7	3557.1	3544.5	(0.4)
Nigeria	2380.9	2166.5	2017.4	1842.0	2430.3	31.9
Venezuela	3107.0	2991.8	3118.5	2878.1	2786.7	(3.2)
Total non-Arab OPEC	**11488.8**	**11307.3**	**11589.3**	**10480.8**	**10973.8**	**4.7**
Total OPEC	**31841.6**	**31342.2**	**31570.3**	**28927.1**	**29476.6**	**1.9**

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Table 2-6 Cont.

	2006	2007	2008	2009	2010*	(%) Change 2010/2009
Brazil	1725.0	1761.0	1810.1	1957.0	2049.7	4.7
Canada	2072.0	2182.2	2164.0	2034.0	2016.8	(0.8)
China	3697.0	3755.0	3802.8	3802.0	4049.0	6.5
CIS	11925.2	12192.3	12429.5	12661.0	13220.5	4.4
Of which: Azerbaijan	648.0	850.0	914.1	1014.0	1027.4	1.3
Kazakhstan	1105.3	1100.0	1385.0	1285.8	1600.0	24.4
Russian Federation	9672.5	9830.0	9768.4	9919.3	10147.6	2.3
Turkmenistan	180.0	189.0	220.0	220.0	220.0	0.0
Uzbekistan	108.0	114.0	105.0	85.0	95.0	11.8
Mexico	3260.8	3111.9	2807.7	2620.7	2594.3	(1.0)
Norway	2353.6	2242.0	2020.0	2017.0	1875.0	(7.0)
UK	1486.3	1460.0	1343.6	1292.7	1196.2	(7.5)
USA	5136.3	5122.2	4940.2	5309.0	5486.0	3.3
Rest of the world	14533.7	19797.5	18553.1	7613.0	7431.4	(2.4)
World Oil Production	**80651.3**	**85606.3**	**84049.2**	**70908.6**	**72109.6**	**1.7**
(%) OAPEC/world	26.7	24.8	25.2	27.7	27.3	
(%) Arab countries/world	28.5	26.5	26.9	29.8	29.4	
(%) OPEC/world	39.5	36.6	37.6	40.8	40.9	
Second : Natural Gas Liquids Production						
OAPEC Members Production	3405.0	3300.0	3270.0	3371.0	3371.0	
Arab countries Production	3415.0	3368.0	3368.0	3481.0	3481.0	
World NGL Production	9208.0	9559.0	9295.0	9223.0	9179.0	
Third : Total Hydrocarbon Liquids Production						
World Total Production	89859.3	95165.3	93344.2	80131.6	81288.6	
(%) OAPEC/world	27.8	25.8	26.2	28.7	28.4	
(%) Arab Countries/ world	29.4	27.4	27.8	30.7	30.4	

* Preliminary estimates.
** Official sources.

Notes:
- Parentheses denote negative figures.
- 50% of the Divided Zone›s oil production is added to each of Saudi Arabia and Kuwait oil production.
- Indonesia›s production is not included in OPEC figures.

Sources:
- OAPEC Data Bank.
- Oil & Energy Trends, Annual Statistical Review, May 2010.
- Oil & Gas Journal, 1 Jan. 2011.
- OPEC Annual Statistical Bulletin, 2009.

Table 2-7
NGL Production in OAPEC Members and Other Arab Countries, 2006-2009
(Thousand b/d)

	2006	2007	2008	2009*	(%) Change 2009/2008
Algeria	1120	1160	1100	1180	7.3
Bahrain	10	10	10	10	0.0
Egypt	65	70	126	124	(1.6)
Iraq	30	30	30	30	0.0
Kuwait	30	40	30	40	33.3
Libya	60	80	80	80	0.0
Qatar	200	210	200	220	10.0
Saudi Arabia	1480	1440	1434	1427	(0.5)
Syria	10	10	10	10	0.0
UAE	400	250	250	250	0.0
Total OAPEC	**3405**	**3300**	**3270**	**3371**	**3.1**
Oman**	-	58	88	100	13.6
Yemen	10	10	10	10	0.0
Total Arab countries	**3415**	**3368**	**3368**	**3481**	**3.4**
World total	**9028**	**9559**	**9223**	**9179**	**(0.5)**
(%) OAPEC/world	**37.7**	**34.5**	**35.5**	**36.7**	**3.6**

* Preliminary estimates.
** Official sources.

Sources:
- OAPEC Data Bank.
- Oil & Energy Trends, Annual Statistical Review, May 2010.
- Oil & Gas Journal Energy Database.

Table 2-8
Arab and World Marketed Natural Gas, 2006-2009
(Million cubic meters/year)

	2006	2007	2008	2009*	(%) Change 2009/2008
Algeria	89200	84800	86500	81426	(5.9)
Bahrain	11300	11800	12700	12800	0.8
Egypt**	59700	56973	60994	62070	1.8
Iraq	1450	1460	1880	1149	(38.9)
Kuwait	12410	12100	12700	11489	(9.5)
Libya	13195	15280	15900	15900	0.0
Qatar	50700	63200	76981	89300	16.0
Saudi Arabia	73461	74420	80440	78450	(2.5)
Syria	5200	5800	6000	5950	(0.8)
Tunisia	2890	3100	3300	3540	7.3
UAE	48790	50290	50240	48840	(2.8)
Total OAPEC	**368296**	**379223**	**407635**	**410914**	**0.8**
Oman**	25139	25179	25200	24496	(2.8)
Total Arab countries	**393435**	**404402**	**432835**	**435410**	**0.6**
Angola	680	830	680	690	1.5
Ecuador	280	275	260	296	13.8
Iran	108600	111900	116300	175742	51.1
Nigeria	28500	32500	32825	23206	(29.3)
Venezuela	20340	20729	20750	18430	(11.2)
Total non-Arab OPEC	**158400**	**166234**	**170815**	**218364**	**27.8**
Total OPEC	**447606**	**467784**	**495456**	**544918**	**10.0**

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Table 2-8 Cont.

	2006	2007	2008	2009*	(%) Change 2009/2008
Canada	188400	184100	173400	161400	(6.9)
China	58600	69200	80300	85200	6.1
CIS	803600	808700	827300	719100	(13.1)
Of which: Azerbaijan	7700	9300	11000	14900	35.5
Kazakhstan	23900	26800	29800	32200	8.1
Russian Federation	595200	592000	601700	527500	(12.3)
Turkmenistan	60400	65400	66100	36400	(44.9)
Uzbekistan	54500	59100	62200	64400	3.5
Mexico	51600	54000	54000	58200	7.8
Norway	87600	89700	99200	103500	4.3
UK	80000	72100	69600	59600	(14.4)
USA	524000	545600	574400	593400	3.3
Rest of the world	534565	560664	578950	552826	(4.5)
World total	**2880200**	**2954700**	**3060800**	**2987000**	**(2.4)**
(%) OAPEC/world	**12.8**	**12.8**	**13.3**	**13.8**	
(%) Arab countries/world	**13.7**	**13.7**	**14.1**	**14.6**	
(%) OPEC/world	**15.5**	**15.8**	**16.2**	**18.2**	

* Preliminary estimates.
** Official sources.

Notes:
- Parentheses denote negative figures.
- Indonesia›s production is not included in OPEC figures.

Sources:
- OAPEC Data Bank.
- Oil & Energy Trends, Annual Statistical Review, May 2010.
- OPEC Annual Statistical Bulletin, 2009.
- Statistical review of world energy full report 2010.

Table 2-9
World Coal Reserves, 2006-2009
(Billion tons at year end)

	2006	2007	2008	2009
North America	**253.2**	**249.3**	**244.9**	**244.9**
Canada	6.6	6.6	6.6	6.6
USA	246.6	242.7	238.3	238.3
Central & South America*	**21.1**	**17.5**	**16.2**	**16.2**
Of which: Brazil	10.1	7.1	7.1	7.1
Colombia	6.6	7.0	6.8	6.8
Europe (except FSU)	**59.8**	**46.3**	**46.3**	**46.3**
Of which: Germany	6.7	6.7	6.7	6.7
Poland	14.0	7.5	7.5	7.5
UK	0.2	0.2	0.2	0.2
Asia/Oceania	**296.9**	**257.5**	**259.3**	**259.3**
Of which: Australia	78.5	76.6	76.2	76.2
China	114.5	114.5	114.5	114.5
India	92.4	56.5	58.6	58.6
Indonesia	5.0	4.3	4.3	4.3
Former Soviet Union (FSU)	**227.3**	**226.0**	**226.0**	**226.0**
Africa	50.3	49.6	32.0	32.0
Of which: South Africa	48.8	48.0	30.4	30.4
Middle East	**0.4**	**1.4**	**1.4**	**1.4**
World total	**909.0**	**847.5**	**826.0**	**826.0**

* Mexico is classified within Central and South America.

Source:
- BP Statistical Review of World Energy, June 2007 , June 2008 , June 2009 and June 2010
.

Table 2-10
World Coal Production, 2006-2009
(Million tons/year)

	2006	2007	2008	2009
North America	**1120.8**	**1109.6**	**1130.8**	**1036.1**
Canada	66.0	69.4	67.7	62.9
USA	1054.8	1040.2	1063.0	973.2
Central & South America*	**91.2**	**96.5**	**101.0**	**94.0**
Of which: Brazil	5.9	6.0	6.6	5.1
Colombia	65.6	69.9	73.5	72.1
Mexico	11.5	12.5	11.5	11.1
Europe (except FSU)	**717.0**	**727.2**	**711.0**	**675.4**
Of which: Czech Republic	62.4	62.0	55.1	53.3
Germany	197.1	201.9	192.4	183.7
Poland	156.1	145.9	144.0	135.1
UK	18.5	17.0	18.1	17.9
Asia/Oceania	**3517.6**	**3730.2**	**4070.2**	**4402.8**
Of which: Australia	382.2	392.7	397.6	409.2
China	2373.0	2526.0	2803.3	3050.0
India	449.2	478.4	515.9	557.6
Former Soviet Union (FSU)	**489.6**	**491.5**	**523.0**	**477.2**
Of which: Kazakhstan	96.2	97.8	111.1	101.5
Russian Federation	309.9	313.5	328.6	298.1
Ukraine	80.2	76.8	79.5	73.7
Africa	**248.8**	**251.5**	**256.0**	**253.0**
Of which: South Africa	244.8	247.7	252.8	250.0
Middle East	**1.5**	**1.6**	**1.6**	**1.6**
World total	**6186.5**	**6408.1**	**6793.6**	**6940.1**

* Mexico is classified within Central and South America.

Source:
- BP Statistical Review of World Energy, June 2007 , June 2008, June 2009 and June 2010.

Table 2-11
Nuclear Power Reactors in Operation and Under Construction Worldwide
(End of 2010)

Country	Reactors in Operation		Reactors Under Construction		Electricity Supplied by Nuclear Reactors 2009	
	No. of Units	Capacity (MWe)	No. of Units	Capacity (MWe)	TWh*	(%) of Total Electricity
Argentina	2	935	1	692	8.0	6.5
Armenia*	1	375	-	-	2.3	44.9
Belgium	7	5863	-	-	47.2	55.9
Brazil	2	1766	1	1245	13.0	2.8
Bulgaria	2	1906	2	1906	15.6	36.2
Canada	18	12577	-	-	89.8	14.2
China	13	8438	26	26230	70.1	1.9
Czech Republic	6	3678	-	-	27.1	33.6
Finland	4	2696	1	1600	23.6	33.0
France	58	63260	1	1600	410.5	75.7
Germany	17	20470	-	-	134.9	22.6
Hungary	4	1859	-	-	15.4	42.7
India	19	3984	6	3786	16.8	1.9
Iran	-	-	1	915	-	-
Japan	54	46823	2	2650	274.6	24.6
Mexico	2	1300	-	-	9.6	3.7
The Netherlands	1	482	-	-	4.2	3.7
Pakistan	2	425	1	300	2.9	3.1

Cont./

Table 2-11 Cont.

Country	Reactors in Operation		Reactors Under Construction		Electricity Supplied by Nuclear Reactors 2008	
	No. of Units	Capacity (MWe)	No. of Units	Capacity (MWe)	TWh	(%) of Total Electricity
Romania	2	1300	-	-	11.8	20.5
Russia	32	21743	11	9153	163.6	16.5
Slovak Republic	4	1711	2	782	14.1	53.8
Slovenia	1	666	-	-	-	-
South Africa	2	1800	-	-	12.1	4.7
South Korea	21	17647	5	5560	147.8	32.4
Spain	8	7450	-	-	52.9	18.3
Sweden	10	8958	-	-	52.6	38.9
Switzerland	5	3238	-	-	27.5	40.1
Taiwan	6	4949	2	2600	41.6	18.1
Ukraine	15	13107	2	1900	82.2	47.5
UK	19	10097	-	-	69.2	18.6
USA	104	100683	1	1165	840.8	20.3
Other	-	-	-	-	16.4	0.6
World total	**441**	**370186**	**65**	**62084**	**2698.2**	**13.4**

* According to IAEA 2008, Armenia's reactor was mothballed, however, it is still listed in its statistics.

Sources:
- BP Statistical Review of World Energy, June 2010.
- IAEA, Website.(Nuclear Power Plants Information), Jan. 2011.

Table 2-12
Installed Hydro Power Capacities in Some Countries, 2007 and 2008

	Installed Capacity (Megawatt-MWe)		Annual Growth Rate 2008/2007 (%)
	2007	2008	
China	147000	147800	0.54
USA	99771	99788	0.02
Canada	73616	74614	1.36
Japan	47313	47341	0.06
France	25128	25175	0.19
Italy	21117	21276	0.75
Turkey	13395	13829	3.24
Austeria	12145	12504	2.96
Mexico	11519	11389	(1.13)
Germany	10067	10001	(0.66)
Australia	9317	9304	(0.14)
South Korea	5492	5505	0.24
New Zealand	5346	5373	0.51
United Kingdom	4269	4373	2.44
Czech Republic	2176	2192	0.74
Belgium	1417	1418	0.07
Hungary	49	51	4.08
Netherlands	37	37	0.00
Denmark	9	9	0.00

Note:
- Parentheses denote negative figures.

Sources:
- IEA Renewables Information 2010 .
- WEC- World Energy Council 2010 (Survey of Energy Resources).

Table 2-13
Installed Wind Power Capacities in Some Countries, 2008 and 2009

	Installed Capacity (Megawatt-MWe)		Annual Growth Rate 2009/2008 (%)
	2008	2009	
USA	25237	35159	39.3
Germany	23933	25813	7.9
China	12121	25853	113.3
Spain	16543	18784	13.5
India	9655	10827	12.1
Italy	3731	4845	29.9
France	3671	4775	30.1
Denmark	3159	3408	7.9
United Kingdom	3263	4340	33.0
Portugal	2829	3474	22.8
Canada	2371	3321	40.1
Netherlands	2222	2226	0.2
Japan	2033	2208	8.6
Sweden	1024	1537	50.1
Austria	996	995	(0.1)
Poland	472	849	79.9
Turkey	458	801	74.9
Egypt	384	552	43.8
Morocco	206	254	23.3
Hungary	127	201	58.3
Tunisia	20	54	170.0

Sources:
- BP Statistical Review of World Energy, June 2010.
- EWEA- European Wind Energy Association, 2010 .
- Global Wind Energy Council, 2010 .
- WEC- World Energy Council 2010 (Survey of Energy Resources).

Table 2-14
Cumulative Installed Photovoltaic Power Capacities in Some Countries, 2008 and 2009

	Cumulative Installed Capacity (Megawatt-MWe)		Annual Growth Rate 2009/2008 (%)
	2008	2009	
Germany	5877.0	9677.0	64.7
Spain	3354.0	3423.0	2.1
Japan	2144.2	2628.2	22.6
USA	1168.5	1645.5	40.8
Italy	458.3	1188.3	159.3
South Korea	357.5	525.5	47.0
France	179.7	364.7	102.9
Australia	104.5	170.5	63.2
Netherlands	57.2	63.6	11.2
Switzerland	47.9	65.9	37.6
Canada	32.7	102.7	214.1
Austria	32.4	37.5	15.7
United Kingdom	22.5	32.5	44.4
Mexico	21.8	23.0	5.5
Rest of the world	1740.9	2981.0	71.2
World total	**15599.1**	**22928.9**	**47.0**

Source:
- IEA Trends in Photovoltic Applications, 2010 .

Table 2-15
Installed Geothermal Capacities in Some Countries, 2008 and 2009

	Installed Capacity (Megawatt-MWe)		Annual Growth Rate 2009/2008 (%)
	2008	2009	
USA	2910.6	3086.6	6.0
Philippienes	1994.0	1904.0	(4.5)
Indonesia	1060.0	1197.0	12.9
Mexico	958.0	958.0	0.0
Italy	810.5	843.0	4.0
New Zealand	628.3	628.3	0.0
Iceland	575.1	575.1	0.0
Japan	536.0	536.0	0.0
Salvador	204.4	204.4	0.0
Kenya	167.0	167.0	0.0
Costa Rica	162.5	166.0	2.2
Republic of Nicaragua	87.5	87.5	0.0
Russia	82.0	82.0	0.0
Turkey	34.6	81.6	135.8
Portugal	29.0	29.0	0.0
Rest of the world	73.6	164.7	123.8
World total	**10313.1**	**10710.2**	**3.9**

Sources:
- BP Statistical Review of World Energy, June 2010.

Table 2-16
Installed Solid Biomass Capacities in some Countries, 2007 and 2008

	Installed Capacity (Megawatt-MWe)		Annual Growth Rate 2008/2007 (%)
	2007	2008	
USA	7056	7172	1.6
Sweden	2570	2761	7.4
Italy	1936	2131	10.1
Finland	1757	1757	0.0
Austria	1699	2024	19.1
Germany	1300	1380	6.2
Denmark	333	558	67.6
United Kingdom	530	513	(3.2)
Mexico	473	473	0.0
Czech Republic	387	468	20.9
Australia	535	454	(15.1)
Belgium	329	442	34.3
Canada	329	442	34.3
Netherlands	324	405	25.0
Spain	396	374	(5.6)
Turkey	72	69	(4.2)
South Korea	6	10	66.7

Note:
- Parentheses denote negative figures.

Source:
- IEA Renewables Information, 2010 .

CHAPTER THREE

ARAB AND WORLD DEVELOPMENTS IN PETROLEUM DOWNSTREAM INDUSTRIES

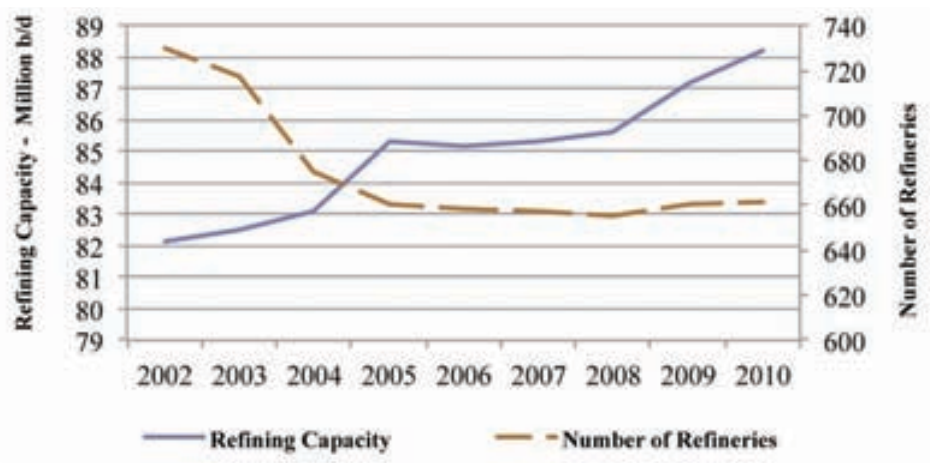
I. REFINING INDUSTRY

1. World Developments

Total world primary distillation capacity of crude oil, reached its highest level over the last ten years in 2010, rising by 1 million b/d above it's level in 2009. It totalled about 88.2 million b/d at the end of 2010 compared with 87.2 million b/d at the end of 2009. This increase is associated with an increase in the number of operational refineries from 661 refineries in 2009 to 662 in 2010, continuing the trend started last year, which reversed a steady contraction during the last ten years. **Figure (3-1).**

Figure 3-1

Development of World Refining Capacity and the Number of Refineries (2002-2010)



The increase of the total primary crude distillation capacity was due to the continuous expansion of refining capacity by 1.5 million b/d in Asia-Pacific region, as a result of increasing capacity of some exiting refineries and the operation of three new refineries namely:

- China's largest oil company, PetroChina, started up its 200,000 b/d refinery at the port city of Qinzhou in the Guangxi region near Vietnam at a cost of $2.2 billion. The refinery consists of a 70,000 b/d heavy residue catalytic cracker, a 44,000 b/d continuous catalytic reformer unit, and a 44,000 b/d hydrocracker unit.

- China National Offshore Oil Corp., began operating the first phase of its 200,000 b/d refinery in Yingkou, Liaoning province.

- Mangalor Refining and Petrochemical Limited (MRPL) had announced an expansion of the refinery's capacity, to 236,000 b/d from 194,000 b/d, as part of the revamping project which has two hydrocrackers and two continuous catalytic reformers.

Global refining industry faced several challenges during the year 2010, affected by the global economic crisis, and the lower demand in petroleum products, resulted in cancelling or delaying several upgrading projects in the existing refineries and closing some existing plants.

Most of the decrease in the refining capacity centred in North America, Europe, and Japan, as in the following examples:

In North America, Sunoco Inc. has shut down it's 150,000 b/d Eagle Point Refinery at Westville, NJ which was temporarily idled last year.

In Canada, Shell Canada closed its 130,000 b/d Montreal East refinery and convert it into gasoline, diesel, and aviation fuel terminal.

In August 2010, Exxon Mobil Corp announced its Chalmette, La., refinery operated in 50-50 joint venture with Venezuela`s national oil company PDVSA, will shut down three units: A middle distillate hydrocracker, a gasoline reformer, and a coker.

In Europe, Swiss Petroplus Holdings AG, Zug, began to temporarily shut down two refineries in October 2010. The first is 60,000 b/d Cressier refinery in Neuchatel, the second is 84,000 b/d Reichstett refinery in France.

Japan has been the other centre for capacity reduction, JX Holding Company planned to complete a reduction of 400,000 b/d by the end of 2010 in the face of decline in domestic demand for petroleum products and cut an additional 200,000 b/d by 2014. By 2020, it plans to cut refining capacity to 1 million b/d. To apply this plan, the company announced in October 2010 that it was considering closing its Negishi refinery in addition to decreasing the refining capacity at the Yokohama-based refinery to 270,000 b/d after it scrapped a 70,000 b/d crude distillation unit.

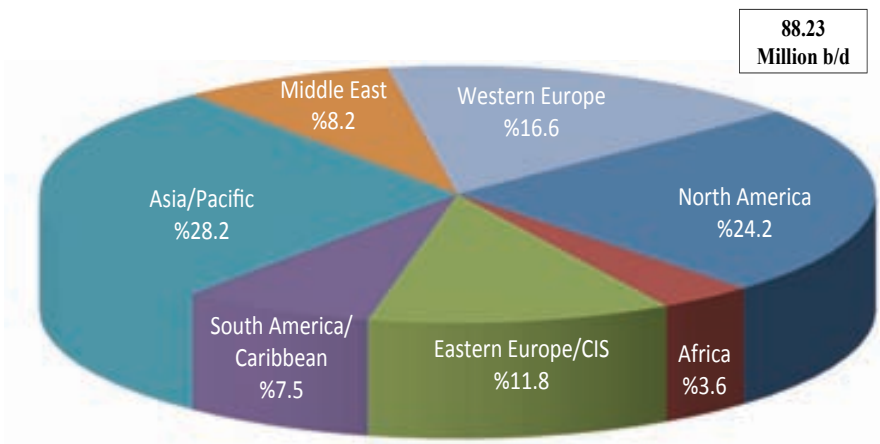
Idemitsu Kosan Company announced that it plans to cut 100,000 b/d by reducing the capacity in four Japanese refineries from 640,000 b/d to 540,000 b/d by 2014.

Asia was the only region among the regions in the world that have achieved an increase in the potential of oil refineries in 2010 compared to 2009, as the region continues to add new and to expand its existing refineries to meet anticipated market demand the increase amounted to

1,340,000 b/d, or 5.69 %. North America recorded a decline of 30,000 b/d or 0.14 % and Western Europe of 280,000 b/d, or 1.88% compared with 2009, as a result of closing some non efficient refineries or reducing the capacity at other refineries to face the changing market demand. Changes in other regions were limited**,** inspite of the recovery in the activity of the establishment investments projects in the Middle East has been brisk. **Figure (3-2)**, **Table (3-1)**

Figure 3-2

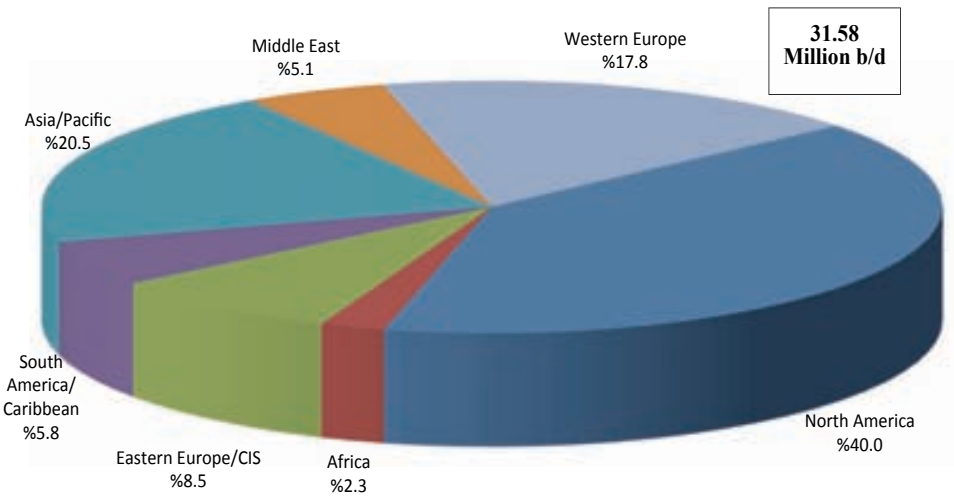
World Primary Distillation Capacity by Region, End of 2010



In another development, the total capacity for catalytic conversion processes, which include fluid catalytic cracking (FCC), catalytic hydrocracking, and catalytic reforming, rose by 110,000 b/d, or 1.35 %, from its 2009 level. At the end of 2010, it totalled to about 31.58 million b/d compared to 31.47 million b/d at the end of 2009. **Figure (3-3)** and **Table (3-2)**.

Figure 3-3

World Catalytic Conversion Capacity by Region, End of 2010



Catalytic hydrocracking capacity recorded the biggest increase in total capacity compared with other catalytic conversion processes. At the end of 2010 it rose to about 5.42 million b/d, compared with 5.38 million b/d at the end of 2008. Catalytic cracking came in second place with an increase of 100,000 b/d, or 0.10%. Catalytic reforming capacity recorded a decline of 20,000 b/d, or 0.17%. At the end of 2010, it totalled 11.50 million b/d compared with 11.52 million b/d in 2009. **Table (3-3)**, **Figures (3-4)**, **(3-5)** and **(3-6)**.

Figure 3-4

World Catalytic Reforming Capacity by Region, End of 2009 and 2010

(%)

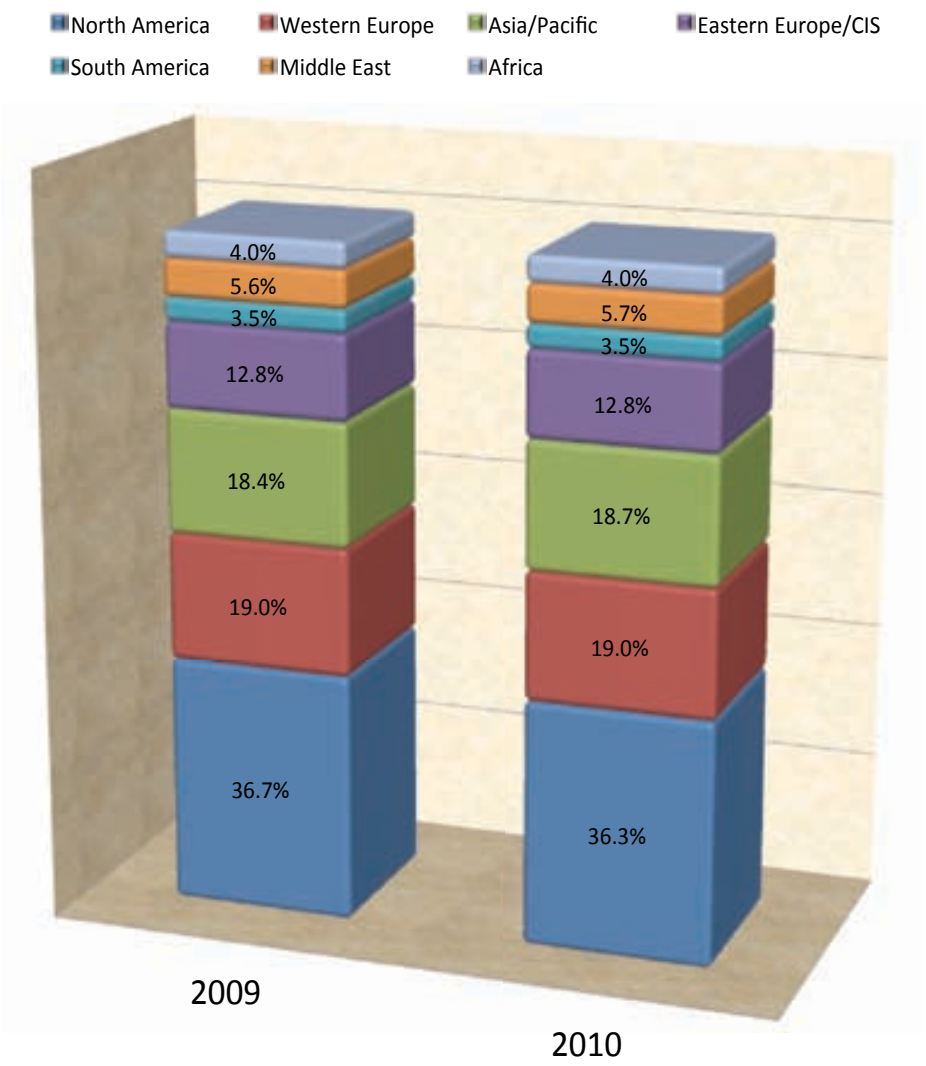


Figure 3-5

World Catalytic Cracking Capacity by Region, End of 2009 and 2010

(%)

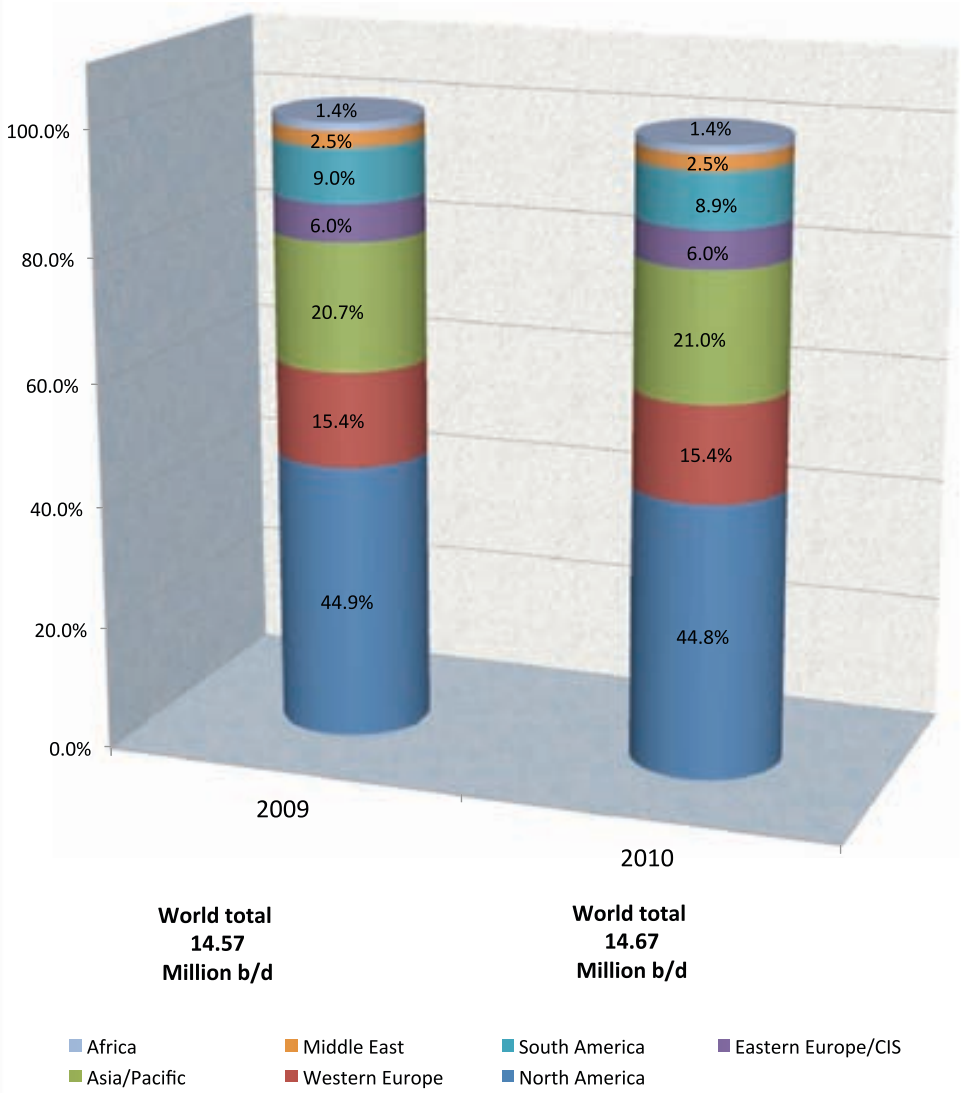
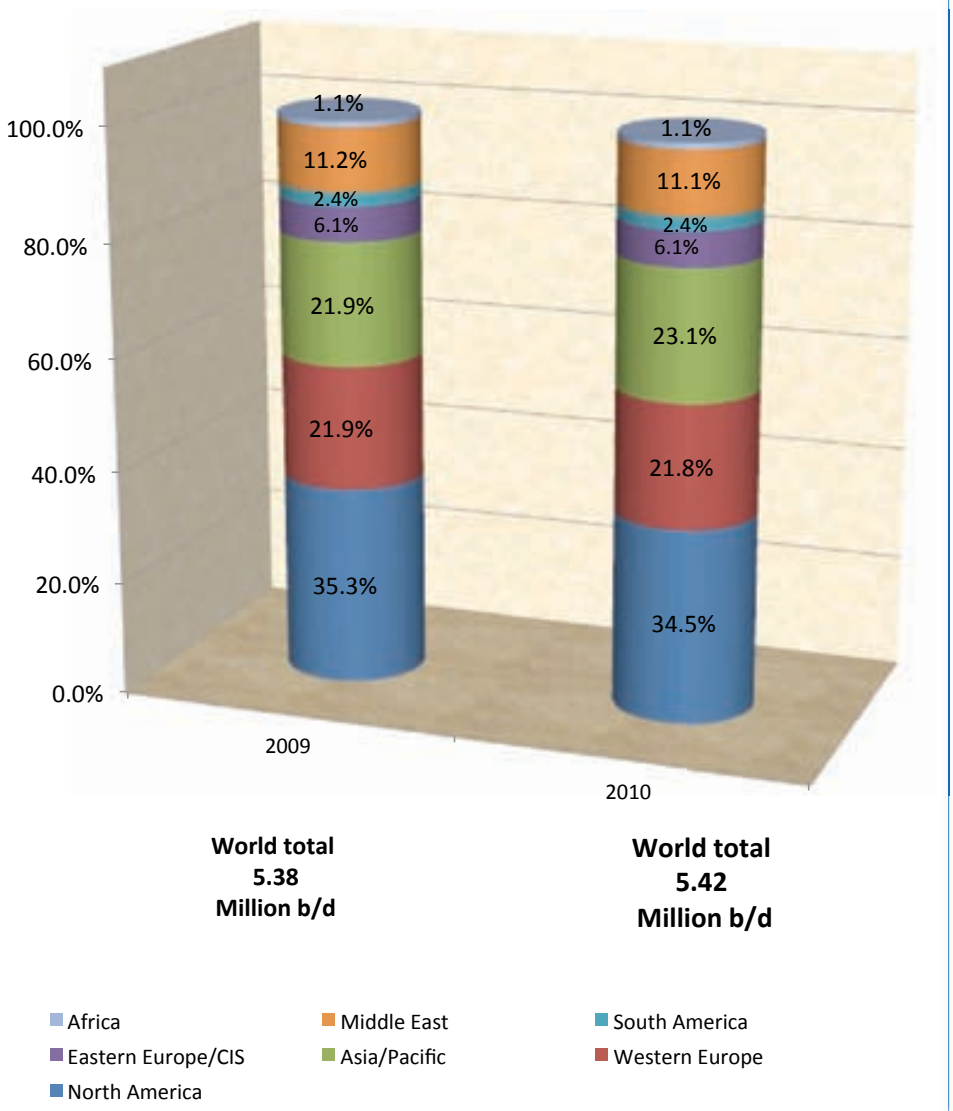


Figure 3-6

World Hydrocracking Capacity by Region, End of 2009 and 2010

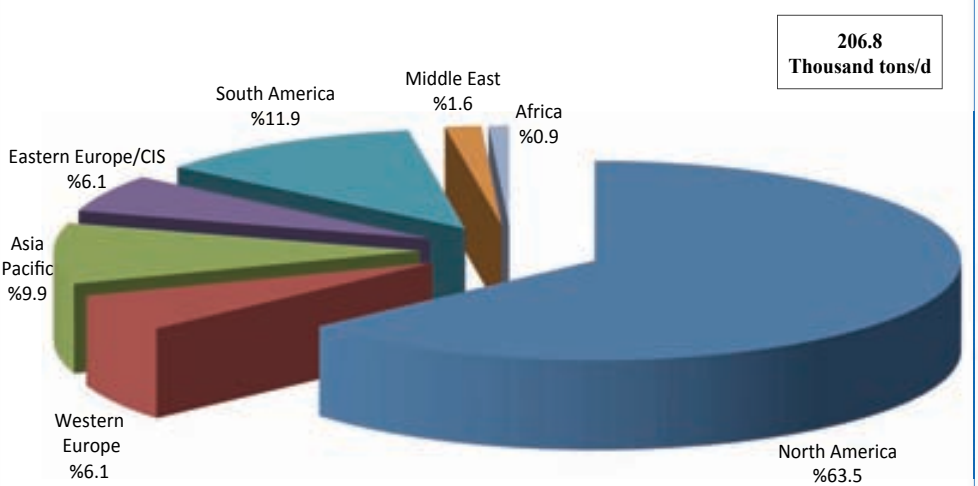
(%)



As for thermal conversion processes, which include both coking and thermal cracking processes, their total coke production capacity in 2010 recorded a decline of 700 tons/day, or 0.35 % lower than in 2009. At the end of 2010 it amounted to about 206,820 tons/day, compared with 207,540 tons/day at the end of 2009. Most of the decline occurred in North America around 650 tons/day, or 0.49 %. Western Europe came next with a drop of 50 tons/day, or 0.87 %. **Table (3-4)**, **Figure (3-7)**.

Figure 3-7

World Capacity for Producing Coke from Thermal Conversion Processes by Region, End of 2010



Total hydrotreating capacity recorded an increase of 430,000 b/d, or 0.96 %, compared with its 2009 level. It totalled 45.42 million b/d compared with 44.99 million b/d at the end of 2009. Asia-Pacific recorded the biggest increase of 310,000 b/d, or 3.19 %, followed by North America with 70,000 b/d, or 0.43 %. Next came Western Europe

with an increase of 40,000 b/d, or 0.40 % and Africa with a rise of 10,000 b/d, or 1.2 % compared with its level in 2009. **Table (3-5)**, **Figure (3-8)**.

Figure 3-8

Distribution of Hydrotreating Capacity by Region, End, 2010

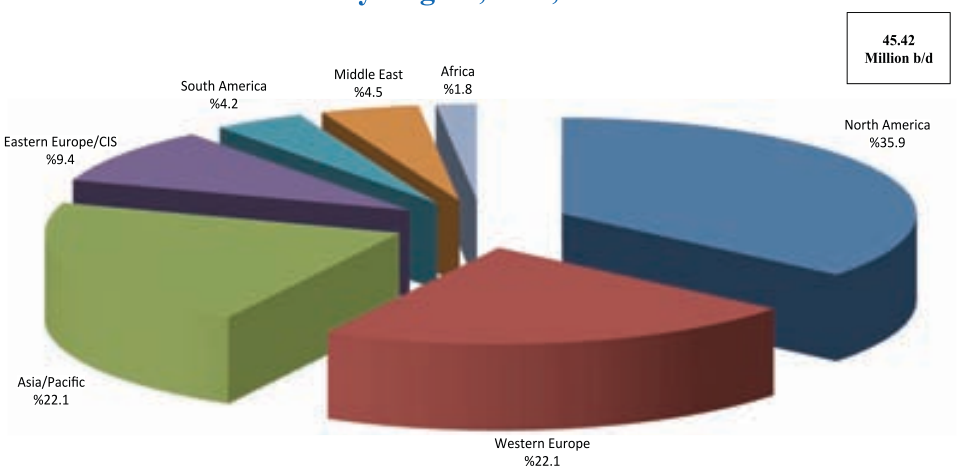


Table (3-6) lists the top 25 refining companies that own most of the worldwide capacity. Major changes in positions were Chevron moved up from the 10th to the 6th class, as a result of capacity increases at its two GS Caltex refineries in Australia. Valero Company dropped two spots from the 6th to 8th as it completed the sale of refineries. CNPC moved as a result of Valero's changes, while Total dropped one spot due to decrease in its refining capacity. Other refiners remained at the same ranking unchanged.

Table (3-7) lists the world's largest refineries with a minimum capacity of 400,000 b/d.

2. Developments in Arab Countries

The total primary distillation capacity of refineries in the Arab states in 2010 remained unchanged from it's level in 2009.

The total primary distillation capacities of the 53 oil refineries in OAPEC member countries accounted for 7.061 million b/d, or 91.03 %, of the total primary distillation capacity of the Arab states amounting to 7.833 million b/d. Total primary distillation capacity at the 11 oil refineries in other Arab states accounted for the remaining 772,000 b/d, or 8.97 %, of the Arab total. **Figure (3-9)**, **Table (3-8)**.

Figure 3-9

Evolution of Primary Distillation Capacity in the Arab Countries, 2006-2010

(Million b/d)

A long list of projects, totalling almost 5.3 million b/d of distillation capacity announced by the Arab countries is facing many difficulties in implementation due to many reasons. It is expected that only about 2 million b/d of additional capacity will come into operation between 2011-2015. This increase is expected from new grassroots projects in Jubail, Yanbu and Jizan in Saudi Arabia and the Ruwais refinery in the United Arab Emirates. **Tables (3-9)** and **(3-10)** summarize the projects status of new refineries in OAPEC and non-OAPEC Arab countries in 2010.

Moreover, many projects in the Arab countries are oriented toward adding conversion and hydro-treating capacity to meet the rising demand for middle and light distillates to meet the requirements of the environmental legislation related to clean fuel production.

The following are the most important developments recorded in the Arab countries.

2-1 Algeria

Ministry of Energy and Mining in Algeria, announced that it plans to double its refining capacity to 800,000 b/d by 2016, through expansion of its existing skikda refinery from 300,000 b/d to 335,000 b/d and building a new 300,000 b/d refinery at Tiaret, which was expected to come on stream on 2011.

2-2 Bahrain

In September 2010, Bahrain Petroleum Company (Bapco) signed an engineering, procurement and construction (EPC) contract worth $69.7 with South Korea's GS Engineering and Construction Corporation for

a wastewater treatment plant at Bahrain's Sitra refinery. The project has a total value of $120 million with planned completion date by the end of 2012.

As part of a plan which was launched in 2008,to upgrade the refinery over the next 10 years at a cost of $5 billion, the National Oil and Gas Authority (NOGA) inaugurated a $150 million desulfurization plant at Sitra refinery.

2-3 Egypt

In May 2010, Egypt's government signed an agreement with two Chinese companies – Rongsheng Holding Group and China National Chemical Engineering – worth $2 billion to build and operate 600,000b/d refinery, and transfer it's ownership to the Egyptian government in 25 years after start-up. The refinery which will be Egypt's largest will provide jet fuel and diesel to the local market while exporting naphtha to China.

In another development, studies showed that the cost of Musturud refinery revamping project rose from $2.35 billion to $3.7 billion, which is expected to be completed in 2014. The project includes a new hydrocracker with a processing capacity of 100,000 b/d of heavy fuel oil. The refinery will be the first in Egypt to produce European grade (Euro-V) refined products, this allowed to receive loans from a wide range of international institutions.

2-4 Iraq

The Iraqi Ministry of Oil has signed the front end engineering and design (FEED) contract with Foster Wheeler for 300,000 b/d Nasiriya

new refinery, also France's Technip has signed a similar contract for a 140,000 b/d Kerbala refinery project, while the other two FEEDs contract for the 150,000 b/d Misan refinery project and the 150,000 b/d Kirkuk project were awarded to Shaw Group of America.

The Iraqi Ministry of Oil announced last year plans to develop the existing refineries, in addition to an ambitious plan to build four new refineries with a total capacity of 740,000 b/d, with an estimated cost of $23 billion a figure which is expected to rise after the completion of (FEEDs).

2-5 Kuwait

The idea of building Al-Zour refinery is still under consideration after being suspended in 2009. Moreover, there is a consensus to push the clean fuel project which involves revamping of the existing other three refineries at a cost of $15-17 billion. The revamping project aims to boost the capability of the existing refineries to produce high quality fuel, according to international standards. The project includes the following:

- Capacity expansion at Mina Abdulla Refinery from 270,000 b/d to 420,000 b/d, to cover the shortfall of the refining capacity of Mina Al- Ahmadi refinery, which will result from shutting down one of its 86,000 b/d distillation units.
- Installing 156,000 b/d heavy atmospheric residue conversion unit at Mina Al-Ahmadi refinery.
- Installing a new 45,000 b/d hydrotreating unit at Mina Al-Ahmadi refinery.

On the other hand, the State of Kuwait continues its efforts to create investment opportunities in Asia in the field of downstream industry, through Kuwait Petroleum International (KPI) owned by Kuwait Petroleum Corporation (KPC).

KPI and Petramina, -an Indonesian State Company-signed a memorandum of understanding (MOU) in August 2010, for a feasibility study to build a new 200,000 – 300,000 b/d refinery which will be integrated with a petroleum complex located in Balongan in West Java.

China`s government has also approved the technical review and granted an environmental clearance for Sinopec to build a $9 billion complex includes 300,000 b/d refinery and an ethylene plant with a capacity of 1 million tons per year, with equal ownership by KPI and Sinopec, however, the Kuwaiti Company is expected to sell 20% of its stake to other partners. The complex will be constructed in Zhanjiang, a coastal city on the south of China Sea. The project is expected to be completed by 2015.

It is expected that the Vietnamese government will issue all necessary approvals for a petrochemical complex and 200,000 b/d Nghi Son refinery to be built in the northern province of Thanh Hoa, 180 km south of Hanoi, the refinery which will be the largest in Vietnam is expected to operate in 2014 and will meet about 60% of the local market needs of petroleum products.

Kuwait Petroleum International (KPI) and Japanese Idemitsu Company contribute 35.1% each in the capital of the joint project, with state-owned company PetroVietnam and Japan Mitsui Chemicals Inc. contributing 25.1% and 4.7% respectively.

2-6 Qatar

Qatar Petroleum announced that its planed Al Shaheen Refinery project was indefinitely postponed. The construction of the 250,000 b/d refinery was scheduled in 2008 at a cost of $ 6 billion. The company is focusing on a plan to double the installed condensate- distillation capacity at its 146,000 b/d Ras Laffan Refinery, which was started up in September 2009.

2-7 Saudi Arabia

Saudi Aramco made remarkable progress in many key projects aiming to expand its downstream industry sector. An ambitious plan to expand the refining capacity by 1.2 million b/d at a total cost of $ 50-60 billion comes through the construction of three new refineries and two petrochemical plants.

The Al Jubail new refinery project is undertaken by Saudi Aramco Total Refining & Petrochemical Company (SATORP), a joint venture between Saudi Aramco (62.5 %) and France`s Total (37.5 %), the total cost of the project which is scheduled to start operation in 2013 rather than 2012 is expected to rise to more than $12 billion, while it was estimated at $6 billion at the beginning.

Al- Jubail refinery was designed to refine heavy crude from Safania and Manifa field of Saudi Arabia. The refinery is characterized by high complexity, as the middle distillate production ratio will reach 55% and 22% of gasoline in addition to huge quantities of petrochemical products.

Saudi Aramco is running preliminary discussions with a number of companies, such as Chinese Sinopec Company to grant a share of the new Yanbu export refinery project, this came as a result of the Conoco

Phillips withdrawal in May 2010, four years after signing a Memorandum of Understanding (MOU). In the absence of the success, Saudi Aramco will follow up the implementation of the project, because of its strategic importance to the Kingdom.

Saudi Aramco is currently working on the construction of 400,000 b/d at Al-Jubail industrial city with an estimated investment of $10 billion. In this regard; seven contracts were signed with local and international companies for engineering, procurement and construction works (EPC).

The refinery will process Arabian heavy crude from Saudi Aramco›s Manifa oil field, which is expected to start production in 2013. The refinery will produce 90,000 b/d of gasoline, 263,000 b/d of ultra low sulfur diesel, 6,300 tons/day of coke and 1,200 tons/day of sulfur.

As for the planned 400,000 b/d Jazan refinery project, the contract of front- end engineering design (FEED) was proposed by September 2010, FEED is expected to be completed by mid- 2011.

Jazan refinery is simpler than the other two new refineries Yanbu and Jubail. It will be a semi-conversion refinery and will largely process Arab light and Arab medium rather than more difficult heavy crudes.

In another development, work is still in progress on developing the existing refineries to boost their capability to produce high quality clean fuel, as follows:

- The revamping project at the existing Saudi Aramco and Shell Refinery (SASREF), involves constructing new hydrotreater and upgrading the existing unit.

- The revamping of Ras Tannura and al-Riyadh refineries.
- Rehabilitation of Al-Khafji Refinery, which was mothballed in 1990.
- The expansion project at the existing Saudi Aramco Mobil Refinery (SAMREF). Phase I will involve the construction of a new hydrotreater, upgrading the existing middle distillate hydrotreater and construction of a fluid catalytic cracking unit at a cost of $700 million. Phase II will involve the construction of a 40,000 b/d hydrotreater, sulphur recovery unit and hydrogen producing unit at a cost of $800 million.

2-8 Syria

Syrian Ministry of Oil and Mineral Resources signed a memorandum of understanding (MOU), with the government of Venezuela to accelerate the joint venture refinery project in Furqlus near the Syrian city of Homs with a total capacity of 140,000b/d and an approximate cost of $2 billion. This project was launched in 2006 as a joint venture between the government of Syria (15%), Iran (25%), Venezuela (33%) and the Al-Bukhari Group of Malaysia (26%). However there has been no significant progress in the project.

Syrian Ministry of Oil announced a plan to build a refinery in Abu Khashab region, in Deir Al-Zour, northeast of Syria with a capacity of 100,000 b/d at a cost of $2 billion, with the participation of China National Petroleum Corporation (CNPC), in addition to another refinery project in Deir Al-Zour with a capacity of 140,000 b/d. However, feasibility studiesof the construction of the two refinery projects are being reviewed.

2-9 United Arab Emirates

Abu Dhabi Oil Refining Company has awarded an (EPC) contract to Koria's Hyundai Company for the construction of the Group III Base Oil production project at Ruwais refinery at a cost of $463 million. The project will have a production capacity of 500,000 tons/year of Group III Base Oil and 100,000 tons/year of Group II Oil, the project also includes the development of the existing hydrocracking unit to provide feedstock and a construction of new refinery units and utilities.

Group 3 Base Oil is a high quality and environmentally friendly oil used for blending top-tier lubricants for car engines.

The project which comes within the plan of Abu Dhabi National Oil Company (ADNOC) to develop the downstream industry is expected to begin production in 2013. It includes the construction of 21 main new process units in addition to other facilities. The project is scheduled to be completed by early 2014.

Abu Dhabi Oil Refining Company (Takreer) announced a project to build a new 400,000 b/d including all the secondary facilities, it will be near Ruwais refinery units about 240km from Abu Dhabi.

As for the non-OAPEC Arab states, investment projects are limited to Jordan and Oman, specifically:

2-10 Jordan

Owing to an administrative errors, the revamping of A'Zarqa refinery has been delayed after signing a contract last year with Infra Mena Company as a strategic partner.

The project includes the construction of new refinery units to improve product specifications and to increase the refining capacity from current 100,000 b/d to 130,000 b/d with an approximate cost of $2.1 billion.

2-11 Oman

Sohar Refinery Company announced an expansion of it's existing refinery project in Sohar from 116,000 b/d to 195,000 b/d, while the 200,00-300,000 b/d planned Duqm refinery and a petrochemical complex on the South Coast was delayed as the Mukhaizna oil field could not provide sufficient quantity of crude to supply the project, not to mention the uncertainty surrounding the project profitability.

II. PETROCHEMICAL INDUSTRIES

1. World Developments

World ethylene production capacity in 2009 rose by more than 6 million tons/year, which is close to the increase recorded last year a 7 million/tons compared to an increase of 2 million tons/year in 2007, and only 245,000 tons/year in 2006. This increase brought world ethylene production in 2009 to 132.9 million tons/year, or 5% higher than the 2008 total of 126.7 million tons/year. It was due to starting up seven world scale ethylene plants, all of them are in China, Saudi Arabia and Singapore, in addition to starting up new production trains in one existing plant in China.

The main development of new ethylene plants are as follows:

China National Offshore Oil Corporation raised its existing ethylene production plant capacity in Daya Bay, Guangdon, by 150,000 tons/year to reach a total capacity of 950,000 tons/year.

In September 2009, Petro China started operations at its Dushanzi refinery and chemical plant in Western Xinjiang region for $404 billion. It includes a 230,000 b/d refinery and a 1 million ton a year ethylene production plant.

In December 2009, Sinopec started up 1 million tons/year ethylene plant as part of its new project that includes a new 200,000 b/d refinery in Tianjin. The project which is a 50/50 $3 billion joint venture- investment with Saudi Basic Industries Corporation (SABIC) increased Tianjin capacity to 1.2 million tons/year. The project supplys 5.87 million tons/year of oil products, 3.2 million tons/year of ethylene, 1.5 million tons/year of synthetic rubber and chemical fibbers and 750,000 tons/year of liquefied petroleum gas (LPG).

In Liaoning province northeast China, Zhenhua Oil started up an ethylene plant at its newly opened 100,000 b/d refinery. Zhenhua Oil is owned by state conglomerate North China Industries Corp. (NORINCO).

In April 2010, Shell Eastern Ltd. started up its new ethylene cracker in Singapore. The Cracker complex is part of the Shell Eastern Petrochemicals Complex, which includes revamping the existing Bukom refinery and construction of a new mono ethylene glycol plant on Jurong island. The new 800,000 tons/year cracker increased Singapore`s ethylene capacity by 40 %, in addition to 450,000 tons/year of propylene, 230,000 tons/year of gasoline, and 155,000 tons/year of butadiene.

In May 2010, Qatar Petroleum started up a new ethane cracker at its Ras Laffan industrial city. The plant feeds the new Qatofin polyethylene plant at Mesaieed which started up in November 2009. The olefin cracker

in Ras Laffan is the world's largest based on ethane with a production capacity of 1.3 million tons/year of ethylene.

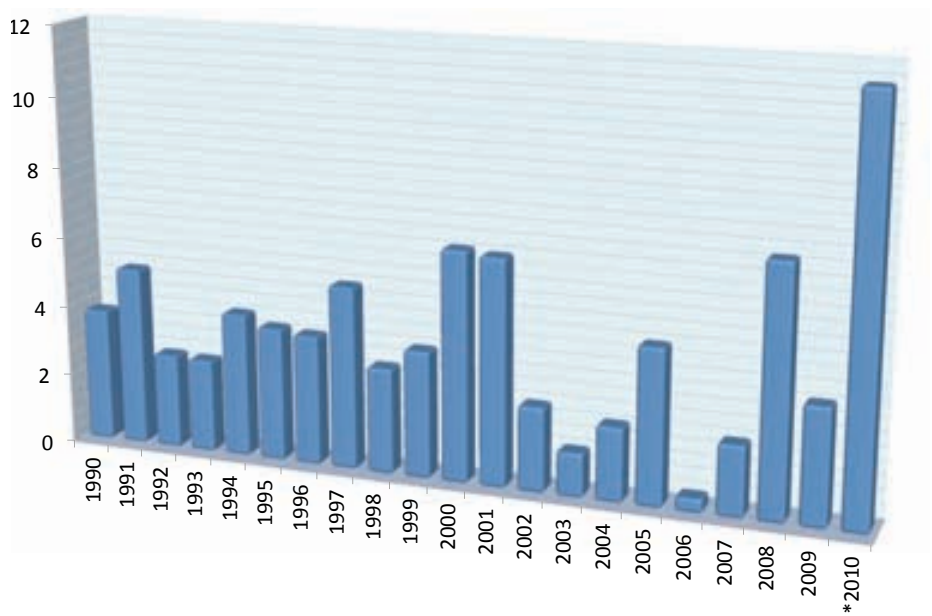
The plant receives feedstock from raw natural gas produced from North field.

Figure (3-10) shows the increases in world existing ethylene production capacities recorded in 2009. The increase in the production capacity of ethylene in the world was the highest in 2008 during the last 20 years after recording the lowest rate of increase in 2006. New projects with 12,000 million tons/year capacity were expected to come on stream in 2010. However, the start up of these projects was delayed because of the global economic recession and oversupply

Figure 3-10

Increases in World Existing Ethylene Production Capacity

2008-2009



In 2009, new projects with more than 10 million tons/year of capacity were expected to start up, but less than half of that capacity (about 3.3 million tons/year) has come on stream.

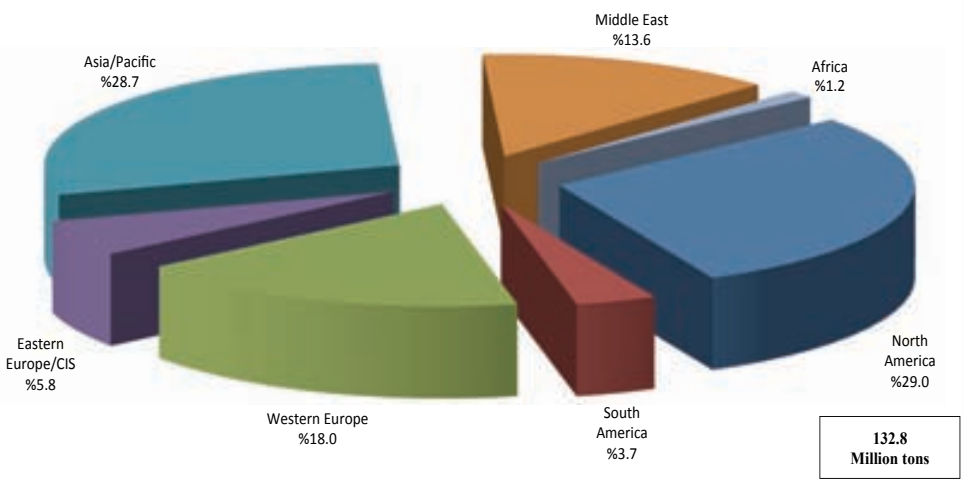
Table (3-11) shows the world's ten largest ethylene production complexes. Formosa Petrochemical Corp. displaced Nova Chemical Corporation from its position on the list due to increasing the capacity of two of its three units at Mailiao to 700,000 tons/year from 450,000 tons/year and to 1.35 million tons/year from 900,000 respectively. The expansions sent the company`s capacity past Nova Chemical by more than 12,000 tons/year.

The rest of the list remained unchanged; even though chevron Phillips Chemical Co. expanded the capacity of its plant in Sweeny, Texas, by 9,000 tons/year.

Table (3-12) compares the existing ethylene production capacity worldwide by regions in 2008 and 2009. **Figure (3-11)** shows distribution of total existing ethylene capacities at the end of 2009.

Figure 3-11

Distribution of Total Existing Ethylene Capacities at the end of 2009



Asia Pacific recorded the biggest increase with a share of 6.3 million tons/year, while China won the lion`s share, reaching 4.4 million tons/year. Middle East and Africa came next, led by Saudi Aramco which started up phase 1 of its new Petro Rabigh petrochemical plant, bringing on stream 1.5 million tons/year ethylene capacity.

North America and Eastern Europe recorded a decline in ethylene production capacity, due to shutdown of units with 935,000 and 600,000 tons/year respectively. The expansions sent the company`s capacity past Nova Chemical by more than 12,000 tons/year.

In USA, Flint Hills Corp. announced the shutdown of its ethylene plant with a capacity of 360,000 tons/year in Odessa, Texas, although it bought a plant from Huntsman Corp. within the last two years. As part of the deal, Flint Hills also acquired and continued operating Huntsman`s subsidiary Port Arther ethylene plant based in Texas with a capacity of 635,000 tons/year. Production capacity of South America and Western Europe remained unchanged.

Several prospective studies predict that the increase in world ethylene production capacity will be centered in the Middle East and Asia-Pacific, while the decline will continue in both North America and Western **Figure (3-12)**.

Table (3-12) compares the existing ethylene production capacity worldwide by regions in 2008 and 2009. **Figure (3-11)** shows distribution of total existing ethylene capacities at the end of 2009.

Figure 3-12

World Ethylene Capacity Growth
(Million tons/year)

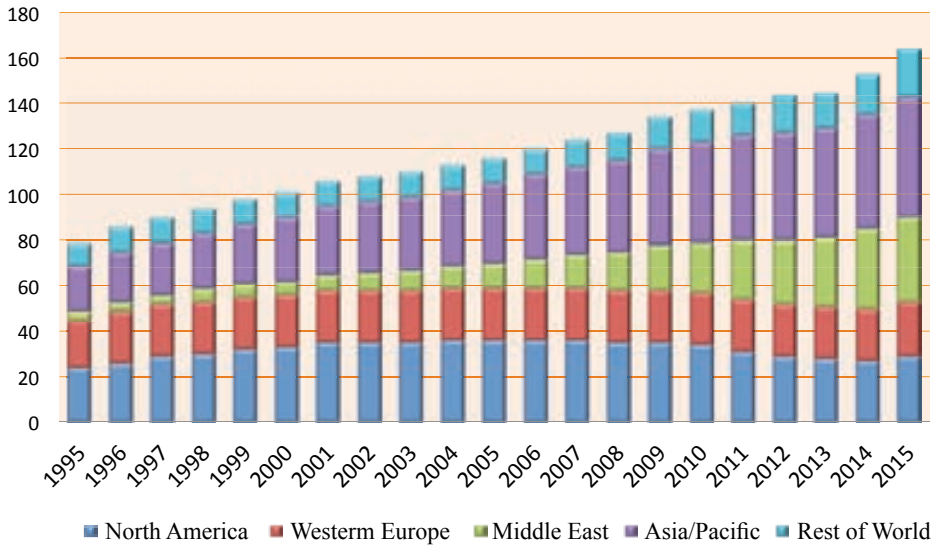


Table (3-13) shows distribution of ethylene production capacity worldwide by countries in 2008 and 2009. It is noted that China achieved the largest increase followed by Saudi Arabia, Singapore, and finally Qatar and Malaysia. USA recorded a net decrease of 938,000 tons/year.

Table (3-14) lists the world's ten largest ethylene producers at the beginning of 2010. Two changes have taken place in the order of the companies. Exxon Mobile Corp. stepped to first place where it outperformed both Saudi Basic Industries Corp (SABIC) and Dow Chemical, the last was at the top of the list for many years. Sinopec stepped up to the fifth place after expanding ethylene production capacity by 1 million tons/year in Tianjin and starting up its new Zhenhai plant with a capacity of 1 million tons/year.

Total AS-which was not enrolled in the list last year- came in sixth place, which led to the withdrawal of Chevron Phillips Chemical where it was ranked tenth in the list of last year. LyondellBasell dropped from fifth place to seventh place, Ineos company came ninth and Formosa petrochemical came down to tenth place.

2- Arab Developmets

2-1 Kuwait

Kuwait's Qurain Petrochemical Industries announced the establishment of United Petrochemicals Company to build two petrochemical plants at a cost of $700 million. Qurain holds a stake of 90%, while Kuwait's United Industries Company holds a share of 10%. This project will be the first of it's kind in Kuwait for the production of purified terephthalic acid (PTA) and polyethylene terephthalate (PET) plants. Qurain did not announce the production capacity or date expected for completion of the construction.

2-2 Qatar

Qatar Petroleum and Exxon Mobil signed an agreement to build a new petrochemical complex in Ras Laffan Industrial City, with an estimated cost of $6 billion; the complex will include the world's largest steam cracker with a production capacity of 1.6 million tons/year, polyethylene plants, in addition to the world's largest ethylene glycol plant. The companies stated that a 650,000 tons/year of gas phase polyethylene and a 700,000 tons/year of ethylene glycol will be exported to the Asia markets. It will utilize gas feedstock from Qatar's North field. Start up of the facility is estimated in late 2015.

In December 2010, Qatar Petroleum and Shell signed a memorandum of understanding (MOU) to prepare a joint study for a project to build a 1.5 million tons/year mono-ethylene glycol (MEG) plant in Ras Laffan Industrial City, using Shell's proprietary OMEGA technology.

Qatar Melamine Company inaugurated a 60,000 tons/year melamine plant in Mesaieed Industrial City, it is the biggest in the Middle East and the second biggest in the world. The plant is producing 5% of total world production of melamine, which is used in colorants, plastics and concrete. The melamine project, with a total cost of $350 million will use the high-quality Urea supplied by Qatar Fertilizer Company as a feedstock for the plant. As part of the melamine project, the existing Urea plant has been revamped using technology from Urea Casala Swiss Company to allow the using Urea as feedstock to produce melamine in the plant. The project cost was about $95 million, including $40 million allocated to meet environmental requirements imposed by the Ministry of Environment.

The melamine production project is of particular significance for the industrial sector in Qatar, because of its important role in the development of downstream industries which consume melamine as well as export the surplus to neighbouring markets.

Qatar Chemical Company II (Q-Chem II) inaugurated a $1.3 billion petrochemicals plant in Mesaieed industrial city with a production capacity of 350,000 tons/year of high density polyethylene (HDPE), which will boost its capacity of polyethylene to 800,000 tons/year. The complex includes the first linear alpha olefins plant in the Middle East, with 345,000 ton/year production capacity. Q-Chem II is a joint venture between Qatar Petroleum (51%) and Chevron Phillips Chemical Company (49%).

2-3 Saudi Arabia

In December 2009, Saudi International Petrochemicals Company (Sipchem) announced the start-up of the initial operation of its vinyl acetate monomer (VAM) plant in Jubail Industrial City, which will reach production capacity of 330,000 tons/year. The company announced in September the start-up of the Acetic Acid Plant with a production capacity of 450,000 tons/year, more than half of its production will be used as a feedstock for the Vinyle Acetate Monomer (VAM) plant. Total investments is expected to reach $13 billion by 2013. The company also announced the accomplishment of the Acetyl complex in Jubail that will cover a wide range for many downstream industries in Saudi, which will have a positive impact on expansion and diversification of final products industries.

In July 2009, Sipchem signed a partnership agreement with South Korea's Hanwha to establish a new petrochemical company in Al-Jubail Industrial City to produce ethylene vinyl acetate and polyvinyl products.

Saudi Basic Industries Corporation (SABIC) announced that›s its affiliated Saudi Kayan Petrochemical Company, signed a Memorandum of Understanding (MOU), with South Korea's Daelim Industrial Company wich was awarded a contract for engineering, procurement and construction (EPC) of a low density polyethylene (LDPE) plant in Jubail with a capacity of 300,000 tons/year. Kayan Petrochemical Company awarded Daelim in October 2009, a $325 million contract for the construction of a high density polyethylene (HDPE) plant in the Jubail complex.

In December 2010, Saudi Kayan Petrochemical Company has started experimental operations of a phenolics plant at its complex in

Jubail Industrial City. The complex contains a production capacity of 290,000 tons/year cumene (isopropyl benzene) plant, as feedstock for the production of phenol plant with capacity of 245,000 tons/year, 150,000 tons/year of acetone, and bisphenol A-plant with a production capacity of 270,000 tons/year, which uses the bulk of the material feedstock for the production of polycarbonate, that is expected to start trial operation in the first half of 2011. In August 2011, the company started looking for additional funding, as a result of the rise in capital expenditure for its giant petrochemical project, which will increase production capacity of petrochemical and the chemicals to more than 5 million tons/year, where the Saudi Basic Industries owns a 35% stake of the project, 45% public ownership, and 20% owned by Saudi Kayan petrochemical Company.

Saudi Basic Industries Corporation (SABIC) and Texas-based Celanese Corporation signed an agreement in April 2010, to build a polyacetyl production unit with a production capacity of 50,000 tons/year, the unit will be located at the SABIC affiliate National Methanol Company (IBN SINA) complex in Jubail Industrial City, it is expected to begin construction in 2011.

The new facility, which is expected to come on stream by 2013, will boost SABIC's position in producing the performance chemicals, that has many industrial applications in the automotive, mechanical and construction fields, as an important part of its 2020 strategic plan. The plant will use methanol produced by IBN SINA as feedstock. Polyacetyl (POA) is an engineered performance chemical product.

In April 2010, SABIC also began commercial production at an expansion of its Sharq Eastern Petrochemical Company, a 50/50 joint

venture with a Japanese consortium led by Mitsubishi. The plant will be able to produce an extra 2.8 million tons/year of ethylene glycol and linear low-density polyethylene, bringing total production capacity up to 5 million tons/year.

On the other side, construction tenders for the expansion of the Saudi Aramco-Sumitomo Petro Rabigh petrochemical complex are expected to be launched in mid-2011. Petro Rabigh Phase II involves construction of a 30 million cubic feet/day ethane cracker, a 2.5-3 million tons/year naphtha reforming complex and an aromatics complex with a capacity of 2 million tons/year.

In May 2010, Saudi Basic Industries Corporation (SABIC) and China Petroleum and Chemical Corporation (Sinopec) announced commercial production at their newly built petrochemical complex in Tianjin, northern China. The $2.7 billion facility, originally projected for start-up in the first quarter of the year, is a 50/50 joint venture. The complex comprises an ethylene cracker and eight downstream facilities with a combined capacity of 3 million tons/year, including of 600,000 tons/year of polyethylene and 400,000 tons/year of ethylene glycol.

2-4 United Arab Emirate

Abu Dhabi Polymer Company Borouge- a joint venture between Abu Dhabi National Oil Company (ADNOC) and Austria based Borealis- awarded a contract worth $1.075 billion to The Linde Group of Germany, to build 1.5 million tons/year ethane cracker, the new project will complement the existing 1.5 million tons/year and 600 thousand tons/year ethane cracker. After completion of the new cracker, Borouge will have the world's largest ethane cracker complex.

In May 2010, Borouge signed three major engineering, procurement and construction (EPC) contracts worth $ 2.6 billion for its Borouge 3 expansion project at Ruwais. The expansion is aimed at quadrupling the facility's production capacity to 4.5 million tons/year by 2013, which will be exported to Middle East and Asia. A joint venture between Italy's Maire Tecnimont and South Korea's Samsung Engineering won two contracts, include the $1.255 billion construction of two polyethylene units with combined capacities of 1.08 million tons/year and 960,000 tons/year respectively. The consortium was also awarded a $400 million contract to build a 350,000 tons/year low density polyethylene (LDPE) unit, while Hyundai Engineering and Construction won a $935 million contract for utilities and off-site facilities construction. The company is currently completing the Borouge 2 expansion, which will provide a capacity of 2 million tons/year of polyethylene and polypropylene.

2-5 Oman

Oman's Octal Petrochemicals awarded a contract to build a polyethylene terephthalate (PET) resin plant with a production capacity of 550,000 tons/year to Germany's Uhde Inventa-Fischer. The plant will be built next to the company's existing polyethylene plant in Salalah

III - NATURAL GAS CONSUMPTION, TRADE AND PROCESSING

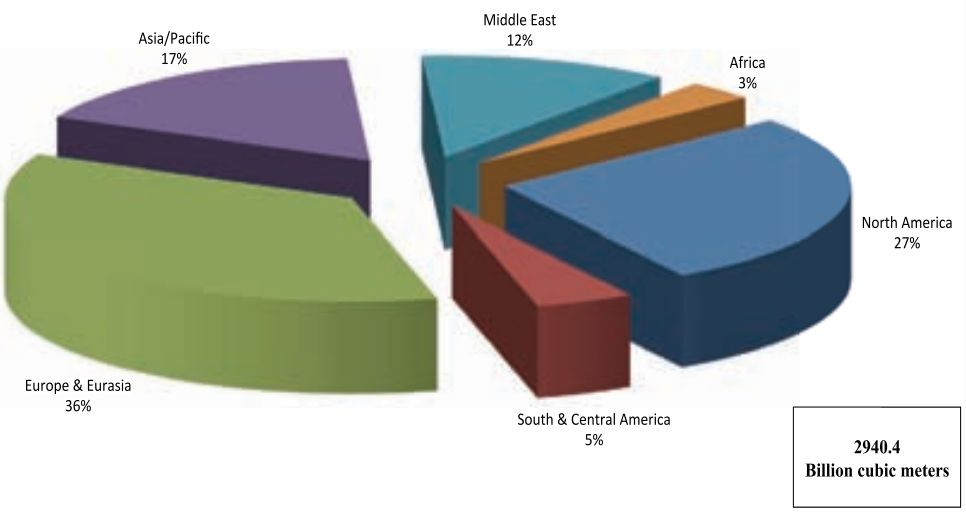
1. World Developments

1-1 Natural Gas Consumption

World consumption of natural gas in 2009 declined by 2.3% compared with its level in 2008. It totalled about 2,940.4 billion cubic meters in 2009, against about 3,010.8 billion in 2008. The share of natural gas in the world's total commercial energy consumption decreased from 24.0% in 2008 to 23.8% in 2009. **Table (3-15)** and **Figure (3-13)** show the distribution of world natural gas consumption by region in 2008 and 2009.

Figure 3-13

Distribution of Natural Gas Consumption in the World, 2009



Most regions of the world have seen decline in gas consumption at various rates in 2009. The maximum rate of decline 0.7% was recorded in Europe and Eurasia (including Europe, the CIS and Turkey), the lowest rate of 1.4% was in North America; while a high growth rate was recorded in the Middle East with 4.2%.

Total natural gas consumption in Europe and Eurasia amounted to 1058.6 billion cubic meters in 2009, against 1138.5 billion cubic meters in 2008, the region remained the highest in terms of natural gas consumption despite the decline rate in demand growth.

In North America natural gas consumption fell by 1.4%, reaching 810.9 billion cubic meters against 822.0 billion cubic meters in 2008, Central and South America followed by 4.5% reaching 134.7 billion cubic meters, against 141.0 billion cubic meters in 2008. In Africa consumption dropped by 2.2%, to 94.0 billion cubic meters in 2009, against 96.1 billion cubic meters in 2008.

Natural gas consumption in the Middle East increased to 345.8 billion cubic meters in 2009, against 331.8 billion cubic meters in 2008. In Asia-Pacific, consumption rose by 3.2% to 496.6 billion cubic meters in 2009, against 481.4 billion cubic meters in 2008.

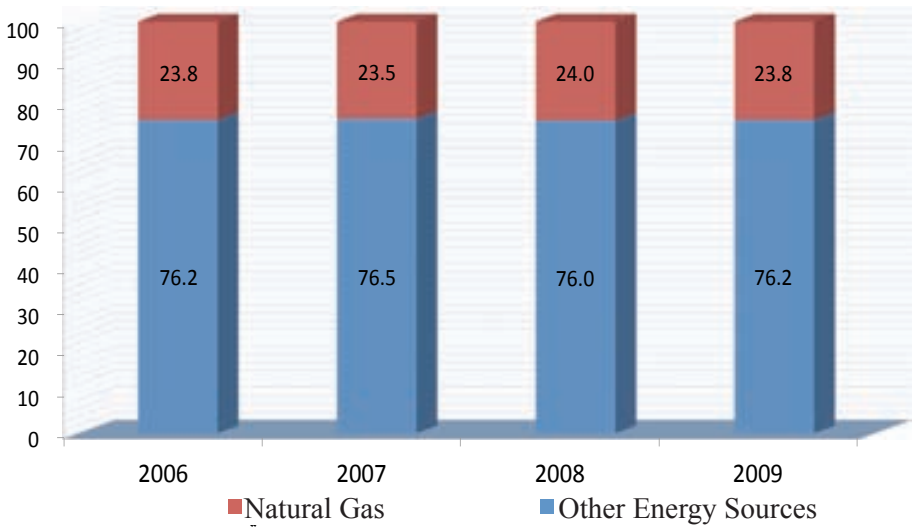
In 2009, most regions of the world maintained its share of natural gas in world commercial energy balance. The Middle East region maintained the highest share with 48.0% against 47.2% in 2008. The share ranged between 10.8% in Asia/Pacific and 34.4% in Europe and Eurasia region.

Table (3-16) and **Figure (3-14)** show the evolution of the share of natural gas in total commercial energy consumption by region in 2006-2009.

Figure 3-14

Share of Natural Gas in the Total Consumption of Commercial Energy, 2006-2009

(%)



1-2 Natural Gas Trade

The volume of natural gas exports worldwide declined by 2.7% in 2009, falling to 791.44 billion cubic meters from about 813.77 billion in 2008. These figures cover gas exports via both pipelines and as a liquefied natural gas (LNG).

Middle East received the largest increase of natural gas exports in 2009 of 92.83 billion cubic meters, equivalent to 14.6%, compared with

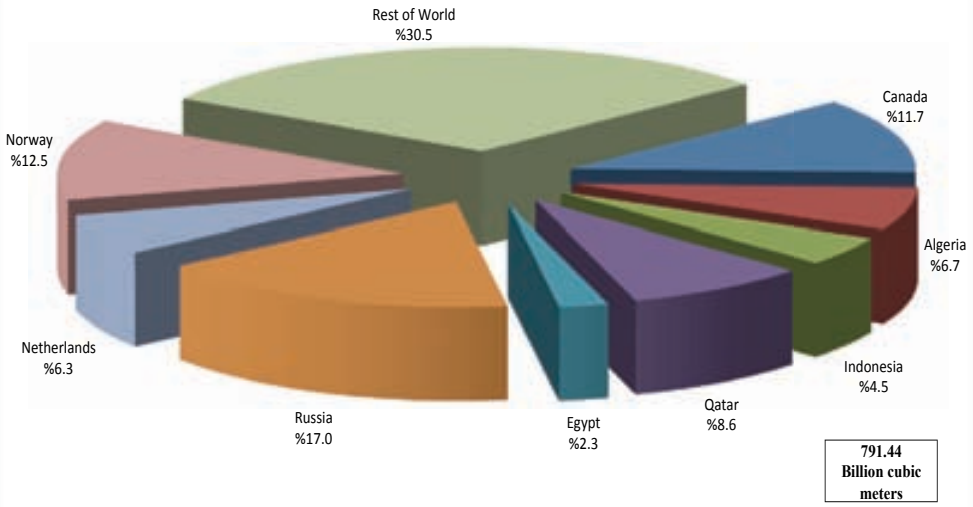
about 81.02 billion cubic meters in 2008, as a result of Qatar's boost of liquefied natural gas (LNG) exports which accounted to 20.1%. Asia-Pacific came second with an increase of 5.1%, due to the increased export by 19.8% in Australia. South America came in third place with an increase of 4.2%, as a result of the increase in its gas exports by 13.7% in Trinidad and Tobago. At the same time, natural gas exports declined in North America, Europe and Eurasia, Russia, Commonwealth and Africa in varying rates.

US net imports of natural gas via pipelines in 2009 totalled about 93.03 billion cubic meters, which represented 14.4 % of its total consumption of natural gas. Canada remained the largest supplier to the USA. In 2009 the US imported LNG from Trinidad and Tobago, Egypt, Norway, Nigeria and Qatar. LNG represented about 12% of total US natural gas imports (12.8 billion cubic meters) and about 1.9% of the US consumption of natural gas. US exports of natural gas in 2009 increased to 29.46 billion cubic meters, or 40.7% over the 2006 record of 20.94 billion cubic meters. Its exports to Canada reached 19.85 billion cubic meters and 9.61 billion to Mexico. Its exports of LNG to Japan totalled about 0.86 billion cubic meters.

Russia topped the world's natural gas exporters, with a share of about 17.0% of world exports in 2009, its natural gas exports via pipelines to most European countries totalled 128.18 billion cubic meters, which was 26.2 billion cubic meters less in 2008. Norway came second with 12.5%, followed by Canada 11.7%, Qatar 8.6%, Algeria 6.7%, the Netherlands 6.3%, Indonesia 4.5% and Malaysia about 3.9%. The exports of the aforementioned countries collectively constitute about 71.2% of total world exports of natural gas, as shown in **Table (3-17)** and **Figure (3-15)**.

Figure 3-15

Natural Gas Export Worldwide, 2009

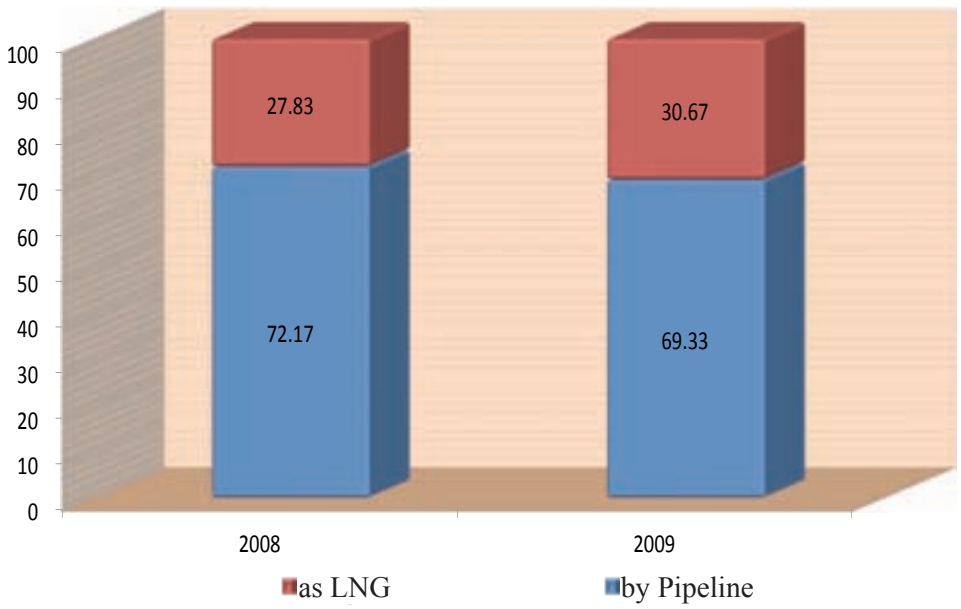


The volume of natural gas exports by pipelines declined from about 587.26 billion cubic meters in 2008 to about 548.68 billion in 2009, or by 6.6%. While LNG exports by tanker rose by 7.2% from 226.51 billion cubic meters to 242.76 billion cubic meters. Pipelines exports accounted for 69.33% of total natural gas exports in 2009, which was less than 2008 record of 72.17%.

LNG accounted for 30.67% of the total world natural gas exports in 2009, against 27.83% recorded in 2008, as shown in **Table (3-18)** and **Figure (3-16)**.

Figure 3-16

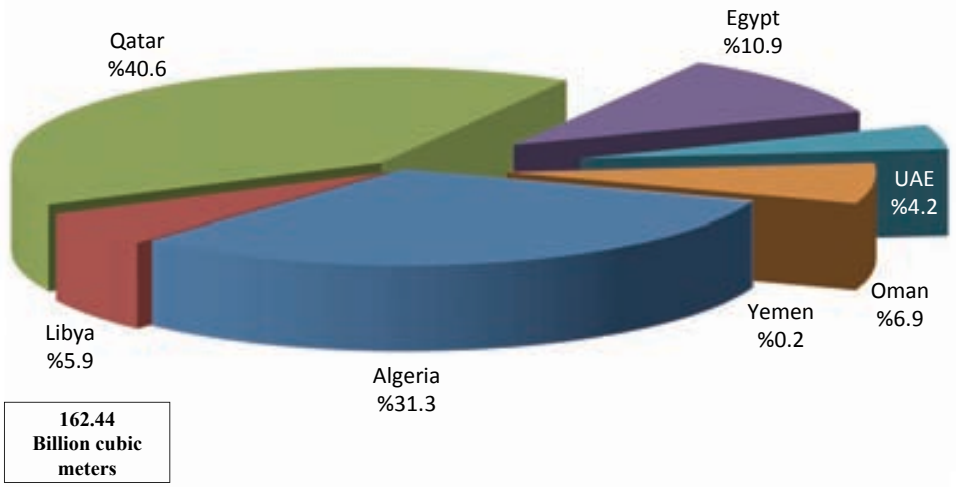
Natural Gas Export Worldwide, 2008-2009



LNG and pipeline gas exports from Arab countries to the international markets continued to rise in 2009 for the fifteenth consecutive year, reaching 168.04 billion cubic meters compared with 162.44 billion in 2008, an increase of 3.4%. Qatar ranked first place of Arab countries with gas exports of 68.19 billion cubic meters, representing 40.6% of total Arab exports in 2009. Algeria came second with total exports of 52.67 billion cubic meters, or 31.3% of total Arab exports, followed by Egypt with 10.9%, Oman 6.9%, Libya 5.6% and finally UAE 4.7%, as shown in **Table (3-19)** and **Figure (3-17)**.

Figure 3-17

Arab Natural Gas Export, 2009



1-3 World Natural Gas Prices

Natural gas prices, for both pipeline and LNG sales dropped significantly and unprecedentedly in major markets in 2009, compared with 2008. The price of natural gas in Canadian markets declined by 57.7%, and fell in the United States by 56.0%, while prices in the UK dropped by 55.1% and by 32.4% in the EU countries. Prices of natural gas transported to Japan (in the form of LNG) fell about 27.8 %, as shown in **Table (3-20)** and **Figure (3-18)**.

meet local market needs, particularly the power generation and water desalination sectors.

The Kingdom launched a bid round for exploration and development of the deep reservoirs located at a depth of 15 to 20 thousand feet. The kingdom is holding negotiations with the Iranian side to build a pipeline to import natural gas, and has signed a memorandum of understanding for defining the project. On another development, discussions continue with the Qatari side to build a pipeline to transport the Qatari gas to Bahrain.

The kingdom is studying a number of alternatives and options to meet the needs of local demands for natural gas, such as the construction of LNG receiving terminal and choosing the appropriate location for it. Activities also include the development of Bahrain natural gas resources to meet local demand through the following:

- The development of the Bahrain field according to the production sharing and development agreement signed between US Accidental, Emirates Mubadala and Bahrain's Oil and Gas Holding Company.
- Exploration for gas offshore (Deep Structures).
- Exploration for gas onshore.
- Development of basic legislation to conserve energy in various sectors.

2-3 Egypt

Egypt implemented 16 projects to develop and produce natural gas in 2009/2010, at a total cost of approximately $1.7 Billion, with a total initial production of 840 million cubic feet per day, and 6390 barrels per day of condensates, in addition to reserves estimated at around 2.3 trillion cubic feet of natural gas, and 12 million barrels of condensates.

Delivery of natural gas to the industrial and residential areas continued, and has been connected to 123 industrial units, or 9% from previous year, reaching 1510 facilities, coordination is currently underway to deliver gas to the new industrial areas, delivery for commercial customers continued reaching to 7641 clients.

The supply of natural gas reached 484 thousand units, an increase of 5% from the previous year, gas is for the first time delivered to Alminia, Assuit , sohag, Qina (Najh Hammadi), Al-Uqssor and Asswan.

The number of vehicles converted to run on natural gas increased by 34% in 2009 from previous year bringing the total to 133,694 vehicles, after adding 10 new new gas filling stations in 2009/2010.

The 930 km South Al Saeid gas pipeline project has been completed at a cost of 5.7 billion Egyptian pounds.

2-4 Iraq

Iraq seeks to utilise its vast natural gas resources. In this context, projects were implemented to develop three gas fields, contracts were initialled for Al-saybah field in south of the country, Almansouriah in the north east, and akkass field in the western region.

These projects aim to exploit the free natural gas and its derivatives to meet the demand of the local market and to export surplus to foreign markets.

The first phase of the Kormor gas field development project in north Iraq was completed by the Emirate's Dana Gas coalition, with a capacity of 300 million cubic feet a day of marketed natural gas, 14 thousand barrels per day of condensates and 1 thousand tons/d of Liquefied Petroleum Gas (LPG).

2-5 Kuwait

The plan of Kuwait Oil Company for developing the Jurassic gas fields discovered in northern Kuwait includes three stages. The company

is moving forward on its implementation despite many challenges faced to reach a production capacity of one billion cubic feet of gas per day, in addition to about 350 thousand barrels per day of light crude oil and condensates by 2015, to meet the needs of the State of Kuwait for electric power generation.

Kuwait current gas production represents 25% of local energy demand; including power generation and water desalination plants. LNG imports to meet the peak demand of summer season were started in 2009.

New discoveries along with continuous development of Jurassic gas and light oil fields play a vital role in improving gas production to meet the rising local demand.

In mid 2009, Kuwait completed the project of building the facilities needed for receiving LNG via the floating gas unloading stations and transforming the LNG into gas to be dispatched to the gas transportation pipeline net, at a capacity of 500 million cubic feet per day to meet its local demand for the gas that outreach the production rate in the peak times, starting from April each year and lasts for six months.

2-6 Libya

The Natural gas transportation networks contributed to providing the supplies needed to consumption centres, where average of gas supply via Bregha/Alkhums coastal pipeline reached about 332 million cubic feet per day in 2009.

Libya is working on several projects to enhance the use of natural gas, such as:

- Increasing the capacity of the coastal gas pipeline.
- Increasing the production capacity of natural gas liquefaction plant in Al-Brega.

- Shell offer for the implementation of a project to modernize the gas liquefaction plant in Marsa Al-Bregas was approved, with an estimated investment of about $293 million. Shell also submitted a proposal to establish a gas liquefaction plant in Ras Lanoof depending on the gas that expected to be produced from its future discoveries.
- Developing the gas plant in Al-hateebah field.
- Increasing the capacity of the gas lift system in Aljabal and Alnaser fields.
- Flared gas utilization project from the fields of Al-Nafoorah, Messallah and Al-Sarir with a capacity of 130 million cubic feet per day.
- Flared gas utilization project from Al-Boori and Al-Jorph offshore fields.
- Developing and exploitation of the existing gas projects included in the development plan that includes the following:

- Developing Bahr Alsalam field/second phase, to maintain its production rate at 760 million cubic feet/day.
- Exploitation of associated gas produced from Albouri field to maintain its current rate of production and reduce gas flaring.
- Exploitation of associated gas produced from Alwaha and Galo fields, and adding about 30 million cubic feet/day of gas and 14 thousand barrels per day of condensates.

- Exploitation of the associated gas produced from Mislah and sarir fields to of about 55 million cubic feet /day of gas, with about 126 million barrels /day of condensates.

2-7 Oman

Work towards producing gas from unconventional tight gas resources has started in Oman, as the development and production putting ups in Makarem and Khazzan fields approached completion. The two fields are located in the block 61, according to a statement given by the secretary of the minister of oil and gas of Oman in August 2010. He stated that the initial production capacity of natural gas from tight gas resources is estimated at about 35 million cubic feet and it is expected to rise within the next year.

The project is executed by the BP Company according to the production sharing agreement signed in 2007. The company completed the drilling of five wells by late 2009; it endeavours to complete the drilling of the rest eight wells during 2011. The total investments of the company reached up to $700-750 million.

The two fields hold collectively about 30 trillion cubic feet of gas reserves, which doubles the current country's total reserves estimated at 35 trillion cubic feet. The success of this project has resulted in opening new areas to explore and develop the natural gas from the unconventional resources in the sultanate.

2-8 Qatar

Qatar has been the world's top LNG exporter since 2006, with a production and exports of 62 million tons/year, total LNG exports are expected to hit 77 million tons/year at the end of 2010, which is the targeted quantity after operating the natural gas liquefying projects of 14 train divided equally between Qatar Gas and Ras Gas for LNG.

Total production of the North field recorded outstanding rates, reaching about 16 billion cubic feet per day during September 2010, as well as 550 thousand barrels per day of associated condensate.

As of 2014, Qatar plans to increase its LNG supply to India to 11.5 million tons annually, compared with present 7.5 million tons annually.

By 2010, preparations were completed to receiving the first shipment of Qatari liquefied natural gas in the Golden bass port in USA. The project is a joint venture between Qatar Petroleum 70%, the rest share distributed equally between Exxon Mobil and ConocoPhillips. The capacity of the port is 15.6 million tons per year of liquefied natural gas.

In September 2010, about 97% of the engineering works for the Pearl GTL project were implemented. The first phase is scheduled to operate by late 2010. The capacity of this project is about 140 thousand barrels per day of high quality petroleum liquids.

In early 2010, the second phase of the Al Khaleej gas project started operation, with a total production of about 2.0 billion cubic feet per day of natural gas.

2-9 Saudi Arabia

Saudi Aramco has signed a $500 million contract with G. E. Energy Company, to supply equipment and compressors for Shaybah field development project in the south eastern region of the Kingdom the project aims at increasing the production capacity of crude and utilizing the associated natural gas. A key part of the expansion will be the construction of LNG recovery plant to process 2.4 billion cubic feet per day of natural gas, and extract 264 thousand barrels per day of condensates and natural gas liquids.

2-10 Syria

The natural gas industry sector has witnessed a significant development over the past year. The General Petroleum Corporation and the Syrian

Gas Company utilize natural gas gathering, processing, transporting through the pipeline network and marketing locally and externally. The ratio of exploited natural gas reached about 94% in 2009.

The distribution of marketed gas consumption varied where the power sector recorded the largest ratio (83.6%) followed by the industrial sector (7.7%), the petroleum sector (7.6%) and housing sector (0.3%). The share of gas exported to Lebanon amounted to about (0.8%) during the year 2009.

The total processing capacity of existing natural gas plants and gas-based complexes is about 38 million cubic meters per day. The work is under way on the implementation of several projects to develop these facilities, for example, the development of the plant in south central region, and the completion of construction of Ebla gas plant to exploit the free gas from Al-Shaer and Alshareefah fields, which has been operated in the first half of 2010. In addition, the work is under way to implement two projects. The first one is the gas plant of north central region, second is Jahar plant of Hayan Petroleum Company. By completing these two projects, the processing capacity will rise to about 46 million cubic meters per day.

Syria seeks to diversify sources of natural gas supply to meet the requirements of the local market. A feasibility study to build a port to receive the liquefied gas tankers is currently undertaken, in addition to the completion of the construction of Arab gas pipeline project to be connected with the Turkish gas network in order to import or export the natural gas to Turkish and global markets.

The execution of the first section of part II that extends from the gas controlling and metering station in Aleppo to the Syrian - Turkish border (Killis), with a length of 62 km and diameter of 36 inches, is currently under way.

The implementation of the second section of part II extends from Homs to Aleppo and linking it with the first part will be in accordance with the requirements of the future.

2-11 Tunisia

Tunisia seeks to control the increasing rate of energy consumption by relying on natural gas, reducing the volume of gas consumption, increasing the efficiency of its use and expanding the gas exploration processes. The current development plan has a target to reduce consumption by 20% in 2011. The natural gas sector provides half of Tunisia revenues for fuel, and the country is expected to achieve a surplus of gas, an estimated two million tons of oil equivalent in 2012 after the completion of Sadr Bael gas field development and the project of south gas. The construction and improving of the gas transportation network will provide a possibility to connect 75 localties with gas distribution network and increase the number of houses connected to the network from 530 thousand to 800 thousand houses in 2012.

2-12 United Arab Emirates

Emirate`s Dolphin Co. has completed the development of gas transportation and distribution network, including the launch of Al-Ain - Fujairah pipeline, in addition to the rental and modernization of the network of ADNOC for gas distribution in the eastern region to supply gas to Abu Dhabi water and electricity company, and the Dubai Corporation for Equipment and Oman Oil Company.

The 244 km pipeline of Al-Taweelah-Al-Fujarah is still under construction, when completed, the pipeline will transfer about 1.6 billion cubic feet per day of gas to the desalination and power generation plants of Abu Dhabi Water and Electricity Company which are located on the east coast of the United Arab Emirates.

3. World's Most Important Gas Activities

Gazprom has started work on building the first project of utilising and extraction the coal gas beds in the Kuzbass basin in Siberia, estimated quantities of about 13 trillion cubic meters. The company hopes to produce four billion cubic meters of coal gas annually in the first phase of the project and to increase it in future to reach to between 18 and 21 billion cubic meters of gas annually. It should be noted that Russia owns a large reserves of these resources, which require modern and sophisticated techniques and a great investment for developing and producing it.

In April 2010, the realization of the 10th session of the Forum of Gas Exporting Countries was opened in Algeria, in the presence of most of the energy ministers of the participating countries, in a difficult situation witnessed by the global gas market that marked a sharp drop of prices and Russia's refusal, the first world producer of gas, to raise prices by reducing production. As the liquefied gas prices decreased from $12 to $4 per million BTU, due to the surplus in the global supply and the unexpected excessive production of the United States of America, during the last three years, that made it able to remove Russia and take the first place globally, thanks to the development and use of new technologies for the development of massive unconventional sources of natural gas represented by shale gas, tight gas and coal beds gas. The meeting outcomes also shows that the global market for gas has seen significant changes in a short period and that the supply has exceeded demand in addition to gas prices in the markets of spot and future contracts fell to weak levels that may threaten the gas contracts in the long run.

Nabucco pipeline project receives significant support by the European Union, as it is considered one of the most important strategic

projects for the transport and marketing of energy. The project has witnessed significant developments on the road to implementation, as Turkmenistan, Azerbaijan, and Egypt have joined the project agreement. A specialized company has been awarded the contract of engineering design and management of the implementation, at a cost of about 9 million Euros. Notably, the length of the transportation pipeline ranged between 3 to 4 thousand km, and a diameter of up to 56 inches.

China is considered one of the big players in the global natural gas trade, due to the size of its current and expected future consumption. It is expected that the local demand for gas will increase from 9 billion cubic feet per year in 2009 to up to about 43 billion cubic feet per year by 2030, with an annual growth rate of up to 7.5 %.

China is working to develop its resources of natural gas, in particular the unconventional resources, as the research and exploration works proved the presence of a huge reserves of coal beds gas and shale gas. The production of gas from these unconventional resources is expected to reach about 11 billion cubic feet per day by 2030. Research studies indicate growing demand for natural gas in China during the upcoming decades, and it will try to import the gas through pipelines or liquefied gas tankers. It is expected to import up to 46 million tons per year of liquefied natural gas.

The work in implementation of south pipeline (South Stream) has started. This pipe line will transport natural gas from Russia to Europe via the Black Sea and then to the European Union countries through Bulgaria, Italy, and Austria. It is worth mentioning that, the project was announced in mid-2007 with the share of Russia's Gazprom and Italy's ENI. It has been agreed in mid-2010 that the share of France Electricity Company to be 20% in the project which capacity will be 63 billion

cubic meters of gas per year. It is expected to be completed by the end of 2015 with an estimated cost of about $20 billion.

The work on building a pipeline to transport the natural gas from Russia to Europe via the Baltic Sea (Nord Stream) is expected to be completed according to the timetable, as more than 500 miles of its total length 1224 km across the Baltic Sea have been completed, and the expected completion of the project is at the end of 2011, with an estimated cost of about 7.4 billion Euros.

TABLES
OF CHAPTER THREE

Table 3-1
World Existing Topping Distillation Capacity by Region, 2009 and 2010
(Million b/d)

	2009	2010	Difference	(%) Change 2010/2009
Asia/Pacific	23.53	24.87	1.34	5.69
North America	21.34	21.31	(0.03)	(0.14)
Western Europe	14.91	14.63	(0.28)	(1.88)
Eastern Europe/CIS	10.34	10.37	0.03	0.29
Middle East	7.25	7.25	0.00	0.00
South America/ Caribbean	6.57	6.58	0.01	0.15
Africa	3.28	3.22	(0.06)	(1.83)
Total	**87.22**	**88.23**	**1.01**	**1.16**

Note: Parentheses denote negative figures.
Source:
- Oil & Gas Journal, 21 Dec. 2009 & 6 Dec. 2010.

Table 3-2
World Catalytic Conversion Capacity by Region*, 2009 and 2010
(Million b/d)

	2009	2010	(%) Change 2010/2009
North America	12.67	12.62	(0.39)
Asia/Pacific	6.32	6.48	2.53
Western Europe	5.62	5.62	0.00
Eastern Europe/CIS	2.68	2.68	0.00
South America/Caribbean	1.84	1.84	0.00
Middle East	1.61	1.61	0.00
Africa	0.73	0.73	0.00
Total	**31.47**	**31.58**	**0.35**

* Includes catalytic cracking, hydrocracking and catalytic reforming.
Note: Parentheses denote negative figures.
Source:
- Oil & Gas Journal, 21 Dec. 2009 & 6 Dec. 2010.

Table 3-3
Regional Catalytic Conversion Capacity by Process, 2009 and 2010
(Million b/d)

	Catalytic Reforming				Catalytic Cracking				Catalytic Hydrocracking			
	2009	2010	Dif-ferent	(%) Change 2010/2009	2009	2010	Dif-ferent	(%) Change 2010/2009	2009	2010	Differ-ent	(%) Change 2010/2009
North America	4.23	4.18	(0.05)	(1.18)	6.54	6.57	0.03	0.46	1.90	1.87	(0.03)	(1.58)
Western Europe	2.19	2.19	0.00	0.00	2.25	2.26	0.01	0.44	1.18	1.18	0.00	0.00
Asia/Pacific	2.12	2.15	0.03	1.42	3.02	3.08	0.06	1.99	1.18	1.25	0.07	5.93
Eastern Europe/CIS	1.47	1.47	0.00	0.00	0.88	0.88	0.00	0.00	0.33	0.33	0.00	0.00
Middle East	0.65	0.65	0.00	0.00	0.36	0.36	0.00	0.00	0.60	0.60	0.00	0.00
Africa	0.46	0.46	0.00	0.00	0.21	0.21	0.00	0.00	0.06	0.06	0.00	0.00
South America	0.40	0.40	0.00	0.00	1.31	1.31	0.00	0.00	0.13	0.13	0.00	0.00
Total	**11.52**	**11.50**	**(0.02)**	**(0.17)**	**14.57**	**14.67**	**0.10**	**0.69**	**5.38**	**5.42**	**0.04**	**0.74**

* Includes catalytic cracking, hydrocracking and catalytic reforming.
Note: Parentheses denote negative figures.
Source:
- Oil & Gas Journal, 21 Dec. 2009 & 6 Dec. 2010.

Table 3-4
World Coke Production Capacity from Thermal Conversion Process by Region, 2009 and 2010
(Thousand tons/d)

	2009	2010	Difference	(%) Change 2010/2009
North America	132.07	131.42	(0.65)	(0.49)
Western Europe	12.71	12.60	(0.11)	(0.87)
Asia/Pacific	20.41	20.45	0.04	0.20
Eastern Europe/CIS	12.57	12.57	0.00	0.00
South America	24.64	24.64	0.00	0.00
Middle East	3.30	3.30	0.00	0.00
Africa	1.84	1.84	0.00	0.00
Total	**207.54**	**206.82**	**(0.72)**	**(0.35)**

Source:
- Oil & Gas Journal, 21 Dec. 2009 & 6 Dec. 2010.

Table 3-5
World Hydrotreating Capacity by Region, 2009 and 2010
(Million b/d)

	2009	2010	Difference	(%) Change 2010/2009
North America	16.25	16.32	0.07	0.43
Of which: Canada	na	na	-	-
Mexico	na	na	-	-
USA	na	na	-	-
Western Europe	9.98	10.02	0.04	0.40
Asia/Pacific	9.72	10.03	0.31	3.19
Eastern Europe/CIS	4.27	4.27	0.00	0.00
Middle East	2.04	2.04	0.00	0.00
South America	1.90	1.90	0.00	0.00
Africa	0.83	0.84	0.01	1.20
Total	**44.99**	**45.42**	**0.43**	**0.96**

Source:
- Oil & Gas Journal, 21 Dec. 2009 & 6 Dec. 2010.

Table 3-6
World's Top 25 Largest Refining Companies, January (2010 - 2011)

Rank as in Jan. 2011	Company	Refining Capacity 1000 b/d	Rank as in Jan. 2010
1	Exxon Mobile	5783.0	1
2	Royal Dutch Shell PLC	4509.2	2
3	Sinope	3971.0	3
4	BP PLC	3325.1	4
5	ConocoPhillips	2778.2	5
6	Chevron	2756.6	10
7	Petroleos de Venezuela SA	2678.0	7
8	Valero Energy Corp	2616.5	6
9	China National Petroleum Corp	2615.0	8
10	Total SA	2451.1	9
11	Saudi Aramco	2433.0	11
12	Petroleo Brasileiro SA	1997.0	12
13	Petroleos Mexicanos SA	1703.0	13
14	National Iranian Petroleum Co	1451.0	14
15	JX Nippon Oil&Energ Corp	1423.2	15
16	Rosneft	1293.0	16
17	OAO Lukoil	1217.0	17
18	Marathon Petroleum Co.LP	1188.0	18
19	Repsol	1105.0	19
20	Kuwait National Petroleum Co	1085.0	20
21	Petramina	993.0	21
22	Agip Petroli SPA	904.0	22
23	Sunoco Inco	825.0	23
24	SK Corp	817.0	24
25	Flint Hills Resources	816.5	25

Source:
- Oil & Gas Journal, 6 Dec. 2010.

Table 3-7
Ranking of World's Top Largest Oil Refineries , January 2011

	Company	Location	Refining Capacity 1000 b/d
1 -	Paraguana Refining Center	Cardon/Judibana, Falcon, Venezuela	940.0
2 -	SK Corporation	Ulsan, South Korea	817.0
3 -	GS Caltex Corp	Yeosu, South Korea	750.0
4 -	Reliance Petroleum	Jamnagar, India	660.0
5 -	ExxonMobile Refining&Supply Co	Jurong/Pulau Ayer Chawan, Singapore	605.0
6 -	Reliance Industries, Ltd	Jamnagar, India	580.0
7 -	S-Oil Corp	Onsan, South Korea	565.0
8 -	ExxonMobile Refining&Supply Co	Baytown, Texas, USA	560.5
9 -	Saudi Aranco	Ras Tanura, Saudi Arabia	550.0
10 -	Formosa Petrochemical Co	Mailiao, Taiwan	540.0
11 -	ExxonMobile Refining&Supply Co	Baton Rouge, Louisiana, USA	503.5
12 -	Hovensa LLC	St. Croix, Virgin Islands, USA	500.0
13 -	Kuwait National Petroleum Co	Mina Al-Ahmadi, Kuwait	466.0
14 -	Shell Eastern Petroleum Co	Pulau, Bukom, Singapore	462.0
15 -	BP PLC	Texas City, Texas, USA	452.3
16 -	Citgo Petroleum Corp	Lake Charles, Louisiana, USA	440.0
17 -	Marathon Petroleum Co. LLC	Garyville, Louisiana, USA	436.0
18 -	Shell Nederland Raffinaderij	Pernis, Netherlands	404.0
19 -	Sinopec	Zhenhai, China	403.0
20 -	Saudi Aramco	Rabigh, Saudi Arabia	400.0
21 -	Saudi Aramco-Mobil	Yanbu, Saudi Arabia	400.0

Source:
- Oil & Gas Journal, 6 Dec. 2010.

Table 3-8
Installed Refining Capacity in the Arab Countries, 2006-2010
(Thousand b/d)

	Number of Refineries in 2010	2006	2007	2008	2009	2010
Algeria	5	450	463	463	463	463
Bahrain	1	249	249	249	262	262
Egypt	8	726	726	726	726	726
Iraq	14	597	597	597	846	846
Kuwait	3	889	889	889	936	936
Libya	5	378	378	378	378	378
Qatar	2	137	137	137	283	283
Saudi Arabia	7	2095	2095	2095	2095	2095
Syria	2	240	240	240	240	240
Tunisia	1	34	34	34	34	34
UAE	5	778	798	798	798	798
Total OAPEC	**53**	**6573**	**6606**	**6606**	**7061**	**7061**
Jordan	1	90	90	90	90	90
Sudan	3	122	140	140	140	140
Somalia	-	10	10	-	-	-
Oman	2	85	222	222	222	222
Morocco	2	155	155	155	155	155
Mauritania	1	25	25	25	25	25
Yemen	2	140	140	140	140	140
Total other Arab countries	**11**	**627**	**782**	**772**	**772**	**772**
Total Arab countries	**64**	**7200**	**7388**	**7378**	**7833**	**7833**

Source:
- Oil & Gas Journal, 6 Dec. 2010.

Table 3-9
New Refinery Construction Projects in OAPEC Member Countries

Country	Project	Status 2009	Refining Capacity 1000 b/d	Status 2010
Algeria	Tiaret	Feasibility study	300	Feasibility study
Egypt	Musturud	Study	50	Study
	Ain al-Sokhna	Study	130	Study
Iraq	Nasiryia	-	300	Preliminary designs
	Karbala	Study	140	Preliminary designs
	Misan	-	150	Preliminary designs
	Kirkuk	-	150	Preliminary designs
Kuwait	Al-Zour Terminal	Postponing	615	Study
Qatar	Al-Shaheen	Study	250	cancel
Saudi Arabia	Yanbu	Construction	400	Construction
	Jubail	Construction	400	Construction
	Ras Tanura	Construction	400	Preliminary designs
	Jizan	Construction	400	Preliminary designs
Syria	Furoqlos	Study	140	Feasibility study
	Deir Al-zour	Study	140	Feasibility study
	Deir Al-zour-2	Study	100	Feasibility study
Tunisia	Skhira	Study	120	Feasibility study
UAE	Fujaira	Feasibility study	500	Postponing
	Ruwais		400	Feasibility study

Table 3-10
New Refinery Construction Projects in Other Arab Countries

Country	Project	Status 2009	Refining Capacity 1000 b/d	Status 2010
Oman	Dukum	Study	200	Postponing
Sudan	Port Sudan	Study	150	Study
Morocco	Al-Jarf Al-asfar	Study	200	Study
Yemen	Rass Issa	Study	160	Study
	Hadramout	Study	50	Study

Table 3-11
World Top 10 Ethylene Complexes, January 2010

	Company Name	Location	Production Capacity Thousand) (tons/Year
1-	Formosa Petrochemical Corporation	Mailiao, Taiwan, China	2935
2-	Nova Chemicals Corporation	Joffre, Alta , Canada	2812
3-	Arabian Petrochemical Company	Jubail, Saudi Arabia	2250
4-	Exxon Mobil Chemical Company	Baytown, Tex	2197
5-	Chevron Phillips Chemical Company	Sweeny - Tex	1853
6-	Dow Chemical Company	Terneuzen, Netherlands	1800
7-	Ineos Olefins & Polymers	Chocolate Bayou, Tex	1752
8-	Equistar Chemicals LP	Channel view , Tex	1750
9-	Yanbu Petrochemical Company	Yanbu, Saudi Arabia	1705
10-	Equate Petrochemical Company	Shuaiba,Kuwait	1650

Source:
- Oil & Gas Journal, 26 July, 2010

Table 3-12
World Ethylene Capacity by Region, 2008 and 2009
(Thousand tons at the end of the year)

	2008	2009	Difference	(%) Change 2009/2008
North America	35407	34469	(938.00)	(2.65)
Asia/Pacific	33362	39731	6369.0	19.09
Western Europe	24918	24918	0.0	0.00
Middle East	17614	18904	1290.0	7.32
Eastern Europe/CIS	8571	7971	(600.00)	(7.00)
South America	5084	5084	0.0	0.00
Africa	1698	1698	0.0	0.00
Total	**126654**	**132775**	**6121.0**	**4.83**

Note: Parentheses denote negative figures.
Source:
- Oil & Gas Journal , 27 July, 2009 & 26 July, 2010

Table 3-13
World Ethylene Production Capacity by Country, 2005 and 2006
(Thousand tons /Year)

Country	2008	2009	Change
Azerbaijan	330	330	0
Argentina	839	839	0
Spain	1430	1430	0
Australia	502	502	0
Palestine	200	200	0
Germany	5757	5757	0
UAE	600	600	0
Indonesia	520	600	80
Uzbekistan	140	140	0
Ukraine	630	630	0
Iran	4734	4734	0
Italy	2170	2170	0
Brazil	3500	3500	0
Portugal	330	330	0
Belgium	2460	2460	0
Bulgaria	400	400	0
Poland	700	700	0
Thailand	2272	2272	0
Turkey	520	520	0
Czech Republic	544	544	0
Algeria	133	133	0
South Africa	585	585	0
Russia	3490	3490	0
Russian Federation	193	193	0
Romania	844	844	0
Singapore	1980	2780	800
Slovak Republic	220	220	0

/.Cont

Table 3-13 Cont.

Country	2008	2009	change
Sweden	625	625	0
Switzerland	33	33	0
Chile	45	45	0
Serbia and Montenegro	200	200	0
China	7348	11778	4430
Taiwan	3621	4006	385
France	3373	3373	0
Venezuela	600	600	0
Finland	330	330	0
Qatar	1030	1220	190
Kazakhstan	130	130	0
Croatia	90	90	0
Canada	5531	5531	0
South Korea	5630	5630	0
North Korea	60	60	0
Colombia	100	100	0
Kuwait	1650	1650	0
Libya	350	350	0
Malaysia	1649	1723	74
Norway	660	660	0
Egypt	330	330	0
Mexico	1384	1384	0
Saudi Arabia	9400	10700	1300
UK	2855	2855	0
Norway	550	550	0
Austria	500	500	0
Nigeria	300	300	0
India	2515	2515	0
Netherlands	3965	3965	0
USA	28492	27554	(938)
Japan	7265	7265	0
Greece	20	20	0

Note: Parentheses denote negative figures.
Source:
- Oil & Gas Journal , 27 July, 2009 & 26 July, 2010

Table 3-14
Top 10 Ethylene Producers
Jan 2010

Company Name	No. of Sites	Production Capacity (Thousand tons/Year)	
		of entire Complexes	With only Company Partial interests
1 - Exxon Mobil Corp.	19	12515	8551
2 - Dow Chemical Co.	18	12145	10079
3 - Saudi Basic Industries Corp.	13	10842	8399
4 - Royal Dutch Shell Plc	13	9358	5947
5 - Sinopec	12	6375	6075
6 - Total AS	11	5933	3472
7 - Lyondell Basell (1)	8	5200	5200
8 - Iran National Petrochemical	7	4734	4734
9 - Ineos	6	4656	4286
10 - Formosa Petrochemical Corp.	5	4476	4476

Notes:
1 - Includes Subsidiary Equistar Chemicals Lp.
Source:
- Oil & Gas Journal, 26 July, 2010

Table 3-15
Consumption of Natural Gas by Region, 2008 and 2009
(Billion cubic meters)

	2008	2009	(%) Change 2009/2008
Europe & Eurasia*	1138.5	1058.6	(7.0)
North America	822	810.9	(1.4)
Asia/Pacific	481.4	496.6	3.2
Middle East	331.8	345.6	4.2
South & Central America	141.0	134.7	(4.5)
Africa	96.1	94.0	(2.2)
Total	**3010.8**	**2940.4**	**(2.3)**

* CIS , Europe and Turkey represented by Europe & Eurasia.
Source:
- BP Statistical Review of World Energy, June 2010.

Table 3-16
Share of Natural Gas in the Total Consumption of Commercial Energy by Region, 2006 - 2009
(%)

	2006	2007	2008	2009
Middle East	45.2	44.3	47.0	47.2
Europe & Eurasia*	33.7	33.8	34.7	34.4
North America	25.4	24.9	26.7	27.6
Africa	19.8	20.3	23.6	23.4
South & Central America	22.0	22.3	22.2	21.5
Asia/Pacific	10.3	10.7	10.9	10.8
Total	**23.8**	**23.5**	**24.0**	**23.8**

* CIS , Europe and Turkey represented by Europe & Eurasia.
Source:
- BP Statistical Review of World Energy, June 2007 & June 2008 & June 2009 and June 2010.

Table 3-17
Natural Gas Exports by Region, 2008 and 2009
(Billion cubic meters)

	2008	2009	(%) Change 2009/2008
Europe & Eurasia*	191.22	182.28	(4.7)
Of which: Norway	94.97	98.89	4.1
Netherlands	55.00	49.67	(9.7)
UK	10.50	12.17	15.9
FSU	160.91	147.92	(8.1)
Of which: Russia	154.41	134.79	(12.7)
Turkmenistan	6.50	5.77	(11.2)
North America	131.56	123.35	(6.2)
Of which: Canada	103.20	92.24	(10.6)
USA	27.15	30.32	11.7
Africa	115.61	105.08	(9.1)
Of which: Algeria	59.37	52.67	(11.3)
Egypt	16.92	18.32	8.3
Libya	10.40	9.89	(4.9)
Nigeria	20.54	15.99	(22.2)
Asia/Pacific	102.51	107.75	5.1
Of which: Australia	20.24	24.24	19.8
Brunei	9.20	8.81	(4.2)
Indonesia	33.50	35.67	6.5
Malaysia	31.02	30.73	(0.9)
Mynamar	8.55	8.29	(3.0)
Middle East	81.02	92.83	14.6
Of which: Oman	10.90	11.54	5.9
Iran	5.80	5.67	(2.2)
Qatar	56.78	68.19	20.1
UAE	7.54	7.01	(7.0)
South America of which:	30.94	32.23	4.2
Bolivia	11.79	9.81	(16.8)
Trinidad & Tobago	17.36	19.74	13.7
Total	**813.77**	**791.44**	**(2.7)**

* CIS , Europe and Turkey represented by Europe & Eurasia.
Note: Parentheses denote negative figures.
Source:
- BP Statistical Review of World Energy, June 2010.

Table 3-18
World Natural Gas Exports by Region, 2008 and 2009
(Billion cubic meters)

	2008	(%)	2009	(%)
A- Exports by Pipeline.				
Europe & Eurasia *	189.03	32.2	178.87	32.6
FSU	160.91	27.4	141.31	25.8
North America	130.59	22.2	122.49	22.3
Africa	53.43	9.1	49.94	9.1
Asia/Pacific	16.82	2.9	19.16	3.5
Middle East	22.90	3.9	24.42	4.5
South America	13.58	2.3	12.49	2.3
Total World Exports by Pipeline	587.26	100.0	548.68	100.0
B- Exports as LNG.				
Europe & Eurasia *	2.19	1.0	3.41	1.4
FSU	-	-	6.61	2.7
North America	0.97	0.4	0.86	0.4
Africa	62.18	27.5	55.14	22.7
Asia/Pacific	85.69	37.8	88.59	36.5
Middle East	58.12	25.7	68.41	28.2
South America	17.36	7.7	19.74	8.1
Total World Exports as LNG	**226.51**	**100.0**	**242.76**	**100.0**
Total World Exports	**813.77**		**791.44**	
Exports by Pipeline/ Total Exports (%)	**72.17**		**69.33**	
Exports as LNG/ Total Exports (%)	**27.83**		**30.67**	

* CIS , Europe and Turkey represented by Europe & Eurasia.
Source:
- BP Statistical Review of World Energy, June 2010.

Table 3-19
Arab Natural Gas Exports, 2005 - 2009
(Billion cubic meters)

	2005	2006	2007	2008	2009
A- Exports by Pipeline.					
Algeria	39.08	36.92	34.03	37.50	31.77
Qatar	-	-	3.77	17.10	18.75
Libya	4.49	7.69	9.20	9.87	9.17
Egypt	1.10	1.93	2.35	2.86	5.50
Oman	1.40	1.40	0.95	-	-
UAE	-	-	-	-	-
Total Arab Exports by Pipeline	46.07	47.94	50.30	67.33	65.19
B- Exports as LNG.					
Algeria	25.68	24.68	24.67	21.87	20.90
Qatar	32.38	37.17	41.84	39.68	49.44
Libya	0.87	0.72	0.76	0.53	0.72
Egypt	6.93	14.97	13.61	14.06	12.82
Oman	9.10	11.90	11.90	11.40	11.54
UAE	7.50	7.77	7.55	7.57	7.01
Yemen	-	-	-	-	0.42
Total Arab Exports as LNG	**82.46**	**97.21**	**100.33**	**95.11**	**102.85**
Total Arab Exports	**128.53**	**145.15**	**150.63**	**162.44**	**168.04**
Exports by Pipeline/ Total Exports (%)	**35.84**	**33.03**	**33.39**	**41.45**	**38.79**
Exports as LNG/ Total Exports (%)	**64.16**	**66.97**	**66.61**	**58.55**	**61.21**

Sources:
- OAPEC -Country papers presented to 9th Arab Energy Conference, Qatar, May 9-12,2010.
- BP Statistical Review of World Energy, June 2006, June 2007, June 2008 , June 2009 and June 2010.

Table 3-20
Average World Natural Gas Prices*, 2005-2009
(Dollar/Million BTU)

	2005	2006	2007	2008	2009	(%) Change 2008/2009
USA	8.79	6.76	6.95	8.85	3.89	(56.0)
Canada	7.25	5.83	6.17	7.99	3.38	(57.7)
Japan**	6.05	7.14	7.73	12.55	9.06	(27.8)
European Union	5.96	8.69	8.93	12.61	8.52	(32.4)
UK	7.38	7.87	6.01	10.79	4.85	(55.1)

* Average CIF Prices.
** LNG Prices
Note: Parentheses denote negative figures.
Source:
- BP Statistical Review of World Energy, June 2010.

OAPEC ACTIVITIES IN 2010

PART TWO
OAPEC ACTIVITIES IN 2010

CHAPTER ONE
THE MINISTERIAL COUNCIL AND THE EXECUTIVE BUREAU

I. THE MINISTERIAL COUNCIL

The Ministerial Council of the Organization of Arab Petroleum Exporting Countries held its 84th meeting in Damascus, Syrian Arab Republic, on 31st of May 2010. The meeting was at the level of Executive Bureau members representing the ministers and was chaired by H.E. Naser Muhammad al- Sharhan, the representative of the United Arab Emirates in the Executive Bureau. The Council held its 85th meeting in Cairo, Arab Republic of Egypt on 25th of December 2010, under the chairmanship of H.E. Muhammad Dha'en Al- Hamli, minister of energy in the United Arab Emirates which chaired the 2010 session.

The resolutions adopted by the Ministerial Council after two meetings in 2010 are included in this report.

II. THE EXECUTIVE BUREAU

OAPEC's Executive Bureau held its 126th meeting in Damascus, Syrian Arab Republic, on 29th of May 2010 to compile the agenda for the 84th meeting of the Ministerial Council. The 127th meeting was held in Cairo on the 2nd of October 2010 to consider the 2010 draft budgets for the General Secretariat and Judicial Tribunal and to submit recommendations

to the Ministerial Council's 85th meeting. The Bureau also held its 128th meeting in Cairo, Arab Republic of Egypt, on 22nd of December 2010 to prepare the agenda for the aforementioned 85th meeting of the Ministerial Council.

CHAPTER TWO

I. THE DATA BANK AND RELATED ACTIVITIES

1. Data bank

During 2010, the General Secretariat has continued developing its data bank and updating the data, this was reflected on the following main activities:

1-1 The Pursuit of Database Update

- The data bank continued to update its database depending mainly on data from member countries, information published by national Arab institutions and bodies and the information included in the technical papers and studies presented at the Ninth Arab Energy Conference.

- In cooperation with Information and Library Department, the data bank has developed a system of information storage, retrieval and updating for the library's archive of the Secretariat using the Oracle-11 software.

- In collaboration with the Department of Personnel, the data bank works on developing a system for storage, retrieval and update of the personnel system in the Secretariat using the Oracle- 11 software.

- The data bank has organized the 3rd workshop relating to the introduction of the data bank to the member countries, this was held at the General Secretary's headquarter in Kuwait on 26th and 27th of January 2010, three specialists have participated in the activities. The meetings of the workshop aimed to give the opportunity for the specialists and the member countries' data bank- staff to be

acquainted with the Secretary General's data bank operating system, and the construction of the available data, it also aimed to exchange opinions and expertise of the participant about the best way to provide the needs and requirements of the member countries.

1-2 Reports and Papers

- In collaboration with other departments of the General Secretariat, the data bank compiled the Annual Statistical Report, 2010, covering the period 2005-2009. It was posted on the General Secretariat's website and made available on compact disks (CD-ROM).
- The data bank participated in preparing the 36th Secretary General's report in its both English and Arabic versions, the report was posted on the General Secretariat's website and made available on compact disks (CD-ROM).
- Based on the British Petroleum Company's database, the data bank compiled a publication of energy data; the booklet was categorized by international grouping and covered the period from 1970 to 2009. The booklet is annually updated and digital copies (CD-ROM) are exclusively circulated to OAPEC member countries as per the agreement with BP.
- The data bank supported the specialized departments in preparing the studies, papers and presentations of 2009 and 2010.

1-3 Other Activities

- Continuous updating of the General Secretariat's website.
- Maintenance of the computers, updating of the software and providing technical support for the users of the software provided by the Secretariat.
- Preparing digital copies (CD- ROM) of the publications, technical papers and studies that the Secretariat aims to distribute through its local or international participations.

- Participating in creating a special page on the Secretariat website dedicated to the activities of the Ninth Arab Energy Conference which was held in Doha/ Qatar 9-12 May 2010.

- Preparing a brochure entitled "Energy Technical and Economic Indices". This was distributed to all participants in the Ninth Arab Energy Conference. The brochure came in two parts, the first part included Arab and international energy data, the second part assigned a chapter to each Arab country, which included its basic data and information on energy sector.

2. Information and Library Services

The library continued its activities of receiving researchers and visitors from different institutions, governmental bodies, other research centers and educational and diplomatic corps in the State of Kuwait. The library received about 130 visitors in 2010.

Within the last year, the library provided its services as follows:

2-1 Bibliographical Services

The General Secretariat's library continued entering the information of Arabic and foreign publications into its new Oracle- system database, such entries included:

- All the information of the General Secretariat's bulletin "Oil and Arab Cooperation".

- The information of some important selected articles of the periodic that the General Secretariat is subscribed to.

- The bibliography of the quarterly Oil and Arab Cooperation Bulletin (issues 132- 135).

- The monthly bibliography of the "New Books in the Library", this is distributed to all the researchers of the General Secretariat.

- A search- dialogue box on the General Secretariat's website was created in collaboration with the data bank to enable researchers within or out of the General Secretariat to know what books and references are made available in the library.

2-2 Indexing and Classification

The library continued to carry out the implementation of technical services related to indexing and classification of new publications and entering the related information into its database. The Library's total collection of books and documents increased from 35,027 in 2009 to 35,306 in 2010.

2-3 Acquisition

The library has renewed the subscriptions to Arabic and English periodicals of 2010, and subscribed to some more new publications; it has also renewed the references concerning the economics, environment and energy sectors in general, with special focus on petroleum industry sector. Moreover, the library continued the usual daily tasks such as:

- Downloading periodicals and e-studies incoming to the General Secretariat's e-mail, at a rate of 20 references per month.
- Classifying all available English periodicals and entering their information into the new Oracle database. Classifying the Arabic periodicals is currently ongoing.
- Ordering the required books and references.
- Following up the delayed orders.
- Following up the official publications of the governmental departments and bodies, and the publications of oil enterprises and companies.
- Storing and sorting of the e-resources arriving to the library.

2-4 General Services

The library provides the following services:

- Lend outs to the General Secretariat's staff, with an annual average of 95 to 120 books and periodicals.
- Binding 300 books and periodicals in 2010.
- Providing daily photocopying services as per request.
- Responding to internal and external queries concerning the library.

3. Studies, Papers and Reports

3-1 A Study on "Geology of Some Sedimentary Basins in the Middle East and their Petroleum Potential"

The aim of the study was to shed light on the historical geology and the structural elements of the most important sedimentary basins in the Middle Eastern countries, and to look into their tectonic and geological characteristics. It also looked into the discovered and undiscovered resources in these basins, and provided a brief about oil and gas production in the Arabic Middle Eastern countries.

The study included four chapters, the first one included the general lithostratigraphic, tectonic and general features of the Middle East region, showed the major sedimentary basins and hydrocarbon accumulations, and presented the reasons why the basins of the Middle East are among the richest pools of the world.

Chapter two included a brief about the basins of the Arab Middle Eastern countries, to show the location and the history of their geological evolution. Chapter three illustrated the most important petroleum accumulations in the region from the Paleozoic to the Cenozoic; it also included the most important producing formations in the Arab Middle Eastern countries tabled according to geological age to facilitate comparing those formations.

Chapter four has touched on known oil and gas reserves, and the undiscovered resources of oil, gas and natural gas liquids. These resources were categorized by basins and by countries. The last published data on oil and gas production in the Arab Middle Eastern countries were also included, along with future plans to improve the production rates in these countries.

Two appendixes were attached to the study, the first included maps showing the evolution of earth and the forming of continents through geological ages, and the second included the geological time-scale used in the study.

3-2 A Study on "Environmental Management System in the Oil Refining Industry"

The aim of the study is to introduce the benefits of applying an environmental management system in the oil refining industry. The study included two parts; the first part contained the most important basic principles of the environmental management system, its evolution stages and the benefits of applying them. The second part addressed the success factors of implementing the system in the oil refining industry, the steps to be followed on the basis of assessment of current environmental status, the design of appropriate environmental measures, the policies and environmental goals, the plans and programs needed to implement those goals and policies and the stage of audit and review required to ensure the continued effectiveness of the system and the continuous improvement of the level of environmental performance in the refinery.

The study also focused on practical issues, and analyzed the results of previous experiences undergone by others, aiming to highlight the benefits that could be obtained, the difficulties faced by the implementation process, and the methods that have been followed to overcome such difficulties.

The study concluded that the best solution to overcome the environmental problems that face the refining industry lies in the implementation of an environmental management system that is integrated with quality,

occupational health and safety management systems. To ensure the best results, the refinery must establish a program of a preliminary review to assess the activities that have an impact on the environment, this comes in parallel with the design of a program dedicated to measure the environmental performance based on a data base shared by all oil refineries in the member countries of the Organization of Arab Petroleum Exporting Countries (OAPEC).

3-3 A Paper entitled: "Investments in the Oil Refining Industry in Arab Countries - Challenges and Opportunities"

This paper was presented to the "Week of Downstream Industry", which was held in Abu Dhabi, the United Arab Emirates during 22-25 March 2010, under the patronage of Abu Dhabi Refining Company "Takreer", Abu Dhabi National Oil Company (ADNOC) and a number of International oil companies. The paper presented the current refining capacity of 64 refineries in the Arab countries amounting to 7.83 million b/d, which is 8% of the total refining capacity in the world, amounting to 87.2 million b/d in 661 refineries. The paper showed the total cost of the expected projects of building new refineries and upgrading the existing ones, along with the goals pursued by refiners to achieve the implementation of these projects; these goals are summarized as follows:

- Meeting the growing demand for petroleum products in local markets.
- Maximizing the production rates of light derivatives at the expense of heavy derivatives, by adding new capacities of transformational processes.
- Producing clean fuels with specifications compatible with the international standards of protecting the environment from pollution, by adding new energies of hydrogen processing and reforming, isomerization and alkylation.
- Bridging the gap between production and consumption of petroleum

products by modifying the structure of the refinery production.

- Improving the refineries abilities to meeting the special legislation requirements of not transmitting pollutants to the environment.
- Diversifying the sources of national income.
- Improving the added value to the crude oil instead of exporting it.
- Creating new jobs opportunities.
- The participation of the private sector in the development of the national income.
- Improving the utilization of existing infrastructure such as pipelines tanks, loading and unloading terminals of crude oil and derivatives and others.

In conclusion, the paper has touched on the obstacles facing the investment projects in the Arab oil refining industry, and the most important strategies adopted to face these difficulties and to overcome their negative effects. Some of most important strategies are:

- Promoting the integration and coordination between Arab refineries.
- Risk-sharing through the building of partnerships with local and international investors.
- Encouraging the local research centers and scientific institutes, and strengthening the cooperation with international consulting firms.

Supporting the existing Arab refineries development projects, to enable them to continue providing the local market with derivatives compatible with the requirements of environmental standards specifications, and enhance their competitiveness in international markets.

3-4 A Paper entitled "Petrochemical Industry in the Arab Countries"

This paper was presented to the meeting of the "Seventh International Petrochemical Conference" held in Renaissance Hotel, Vienna - Austria from 9 to 11 February 2010, and organized by World Refining Association.

The paper reviewed the importance of the petrochemical industry in the Arab oil and natural gas producing countries as an important strategic objective to diversify sources of national income and reduce the near-total dependence on exports of crude oil. The paper pointed out that the petrochemical industry in Arab countries faces many challenges, most notably the environmental aspects and speed of implementation of projects and lack of coordination in the quantity and quality of production so that these countries are competing with each other. The multiple sources of technologies and requirements for the protection of intellectual property, lead to hinder the exchange of expertise between Arab countries. The paper reviewed the evolution of the petrochemical industry in the Arab countries, and showed its un- preceded boom in 2004 that was not seen since the late seventies of the last century.

The paper indicated that the petrochemical industry in the Arab countries lacks the presence of Arab entity for petrochemical producers interested in the coordination of Arab interests and providing the necessary services to them just like petrochemical unions in advanced industrial countries. The industry needs to establish an integrated modern petrochemical information network to identify all the developments in the Arab and international markets and protect the interests of producers through the continuous coordination with the higher authorities who represent the economic policy-makers related to this sector.

The paper concluded that:

- Arab countries have a number of features, infrastructure and natural resources, encouraging the establishment of a sophisticated petrochemical industry.

- The Middle East is expected to play an active role in the global petrochemical markets in the long run; the volume of production of petrochemicals in 2010 is predicted at about 20% of the total global production of basic petrochemicals.

- Coordination and cooperation among Arab countries in the field of petrochemical industry in general and in the field of research and development in particular is necessary to support placing these countries on the map of the major petrochemical industry players in the world.

II. ARAB AND INTERNATIONAL COOPERATION

The Ninth Arab Energy Conference

The Ninth Arab Energy Conference was convened in Doha, capital city of Qatar, 9-12 May 2010 with 'Energy and Arab Cooperation' as its theme. During the four days of the Conference, discussions took place on different international developments in the oil and natural gas industry and their repercussions for Arab countries. Several papers presented to the Conference discussed the prospects and risks of investments in oil and gas projects; the role of regional markets and energy organizations in stabilizing global markets and the expected technologies developments up to 2050 and their possible impact on the oil and natural gas sector in the world and the Arab region. A summary of the Conference proceedings follows:

The Opening Session

H.E. Abdullah bin Hamad Al-Attiyah, Qatar's Deputy Prime Minister and Minister of Energy, delivered the opening speech, in which he welcomed the delegates and conveyed the regards and good wishes of HH Sheikh Hamad bin Khalifah Al Thani, the Amir of Qatar. Thereafter, Mr Al-Attiyah gave a brief survey of the topics and issues to be discussed studied and analysed at the Conference.

Mr Al-Attiyah said that the Conference would deal with several topics of interest to the oil and gas producing and exporting countries and that discussion panels and technical papers and those papers submitted by delegates would discuss the general recent developments in the global oil markets and their repercussions on Arab countries. The Conference would also discuss ways of energy rationalization in Arab countries, consider the prospects and opportunities of Arab oil investments as well as other topics related to the environment and sustainable development and what modern technology would bring to the Arab oil and gas industry, in addition to discussing the prospects of Arab cooperation in the field of energy.

Mr Al-Attiyah emphasized the vital role played by Arab countries in meeting the global demand for energy. He explained that this role would become even more important in coming years because of the huge proven reserves of oil and natural gas in the Arab region and the unfailing efforts by Arab countries to develop those resources. Mr Al-Attiyah went on to say that the Arab region also had huge sources of new and renewable energy, especially solar energy and wind energy.

Next, Mr Al-Attiyah looked at Qatar's role in supplying global markets with crude oil and oil products, especially natural gas, either through pipelines or in liquefied form, Qatar being considered the world's leading producer and exporter of liquefied gas, with its production expected to reach around 77m tons at the end of 2010. Mr Al-Attiyah referred to the existing huge projects in Qatar aimed at supplying global markets with clean fuel using gas liquefaction technology (GTL). He pointed out the exporting Qatari gas through pipelines to the UAE and the Sultanate of Oman constituted a solid cornerstone of Arab cooperation in the field of natural gas.

In his speech on behalf of the organizations sponsoring the Conference, H.E. Abdulatif Y. Al-Hamad, Director General and Chairman of the Arab Fund for Economic and Social Development (AFESD), expressed deepest gratitude and appreciation to HH Sheikh Hamad bin Khalifah Al Thani, the Amir of Qatar, for his patronage of the Conference, held in Doha, which had become a major Arab and international Energy centre and a main venue for Arab constructive dialogue and cooperation. He said that the organizations sponsoring the Conference felt honoured that the Conference was convened in Doha, a fact that underlined the deep cultural and historical ties binding the countries of the Arab region together and reinforcing joint Arab action in the field of energy. Mr Al-Hamad then reviewed the work of the Arab Energy Conference since its launch 31 years before and the issues that remained central to its thinking during that period. He said that ever since the Third Arab Energy Conference, held in Algiers in May 1985, the sponsoring organizations had chosen the theme 'Energy and Arab Cooperation' in an obvious reference to the strong connection between

these two and to their impact on the Arab world at all levels, economic and social. He added that the Arab Energy Conference, launched 31 years earlier, had become a specialized Arab forum for discussing energy issues in the Arab region such as sources, possibilities of development, exploitation and conservation, in addition to exploring the prospects of many-faceted cooperation in the energy industry generally at the Arab and international levels. Mr Al-Hamad considered the Conference to be an important forum allowing experts in energy, economics and investment to exchange views on developments in the oil markets and the factors impacting them and consider the possible repercussions on Arab countries and global economy. Mr Al-Hamad emphasized the close link between environmental issues and the energy industry in so far as international constraints and standards might affect sustainable development programmes in the Arab region. He stressed that the issue of the environment was of paramount importance to all Arab countries.

Mr Al-Hamad recalled that the Arab Economic, Development and Social Summit, held in Kuwait in January 2009, came in response to a national and Arab wish to take more interest in issues of development, economy and social problems. That summit dealt with several Arab economic issues, some of which were consistent with the subjects to be discussed in the Ninth Arab Energy Conference. He said that the Kuwait Declaration summed up those topics with its call for dealing with Arab economic ties in more depth and with more rigour. Finally, Mr Al-Hamad stressed the link between Arab security, social peace and economic development.

Speeches by Ministers and Heads of Delegations

Ministers of oil and energy, who headed their national delegations to the Conference, dealt with the present and prospects of oil industries in their countries and the possibilities of Arab cooperation in this field. A summary of their speeches follows:

The first minister to speak was H.E. Mr Ali bin Ibrahim Al-Naimi, the Saudi Minister of Oil and Mineral Resources, who reviewed the most important developments that took place since the Eighth Arab Energy

Conference, held in Amman in 2006, and had a direct effect on the energy industry in the Arab region and globally. Among the most important of these was the slow-down in economic growth worldwide by the end of 2007, the beginning of the international credit crunch in September 2008, and the sharp unprecedented rise in oil prices in the middle of 2008, followed by the sharp fall in prices at the end of that year, then price stabilization again.

Mr Al-Naimi referred to the fall in global demand for oil in 2008-2009, unprecedented since the 1980s, and to the change in the global pattern of consumption reflected in the fall in demand for oil in the leading industrial nations, compared to rising demand by some developing economies, including Arab economies.

Mr Al-Naimi pointed out that Saudi Arabia followed a moderate oil policy that sought to maintain its energy supplies to the rest of the world while at the same time maintaining a surplus production capacity to be used at the time of need. He stressed Saudi Arabia's keenness to support cooperation, reinforce and develop coordination among the member states of OPEC in order to ensure fair oil returns for oil exporting countries on the one hand and avoid causing harm to world economy on the other. Saudi Arabia, he explained, had close links with most oil-exporting and oil-consuming countries and was remarkably active in many international oil forums.

Mr Al-Naimi called for strengthening Arab cooperation and coordinating oil and energy policies both regionally and globally to allow for joint work to face the different developments and challenges. He also called for developing Arab human resources working in the energy sector and trying to benefit from the best advantage enjoyed by Arab countries, i.e., abundance of energy sources, in order to diversify sources of income and ensure a decent life for Arab populations.

Next, H.E. Shaikh Ahmad Al-Abdullah Al-Ahmad Al-Sabah, the Kuwaiti Minister of Oil and Information, called for exerting efforts to achieve close cooperation among Arab countries in different spheres of

energy in order to fulfil obligations to global markets and contribute to the security of energy supplies. He also called for activating the role of Arab energy organizations; supporting the existing projects by starting new economically feasible projects and partnerships with the private sector in owning and running those projects. Shaikh Al-Sabah recalled that Kuwait had always been keen to advocate Arab cooperation in different spheres, including oil. A case in point was the fact that Kuwait, together with Saudi Arabia and Libya, was the first to pave the way for Arab cooperation in the field of oil in 1968 by concluding the agreement leading to the creation of the Organization of Arab Petroleum Exporting Countries (OAPEC), based in Kuwait. Besides, Kuwait proactively contributed to setting up and supporting many other Arab economic and oil organizations.

Shaikh Al-Sabah went on to outline Kuwait's oil strategy up to 2030, which centred around increasing production capacity to 4m b/d by 2020; expanding refining capacity; widening the activities of petrochemicals industries; developing and updating the fleet of tankers transporting crude oil, oil products and liquefied oil gas; expanding external processes of exploration, refining, processing, transportation and distribution. Furthermore, Kuwait would increase gas production to 1bn cubic foot per day by 2016; work to attract and qualify the national workforce to manage oil processes within and outside Kuwait. Kuwait would also exploit sources of new and renewable energy, especially solar energy and wind energy, in addition to attending to scientific research and following up scientific developments in the field of energy technology.

In his speech, H.E. Jubran Baseel, the Lebanese Minister of Energy and Water, looked at the challenges facing the energy industry in Lebanon and the acute shortage of energy, especially electrical energy. He went on to say that an oil strategy in Lebanon would involve remedying the shortage in electricity by introducing reforms to the sector. He noted that Lebanon had a future plan for developing the distribution, transportation and production processes in the electricity sector. Mr Baseel called on Arab countries to invest in energy projects in Lebanon, whether in the oil or renewable energy sectors. Mr Baseel

concluded his speech by extending his country's invitation for the Tenth Arab Energy Conference in 2014 to be held in Lebanon. His invitation was unanimously accepted.

H.E. Ahmad Al-Hassan, the Sudanese Minister of Energy and Mining, outlined the main features of the relatively new oil sector in Sudan. He mentioned present and future projects, saying that a few Arab and foreign companies were now carrying out prospecting activities in most regions of Sudan. He noted the many promising opportunities for investment in the energy sector in Sudan, including water, solar energy, oil services and petrochemicals. Mr Al-Hassan concluded his speech by inviting specialized Arab companies to invest in Sudan.

Next, H.E. Dr Abdul-Hussain bin Ali Mirza, the Bahraini Minister of Oil and Chairman of the National oil and Gas Authority, took a historical look at the oil industry in Bahrain. His country, he said, was the first member state of the Gulf Cooperation Council (GCC) and the twelfth in the world to discover oil in its territory in commercially feasible quantities in 1932. This was followed by the construction of an oil refinery in 1936, which was the first in the Arabian Gulf region. Dr Mirza discussed Bahrain's plan of re-organizing and re-structuring the oil sector in 2005 and setting up the National Oil and Gas Authority, which was a main feature of the plan and a crucial step in the history of the oil sector in Bahrain. He added that the Authority's vision was to ensure continuity of oil and gas supplies to sustain economic development and raise the standard of living, an objective of the economic vision for 2030 in Bahrain. Dr Mirza mentioned the leading projects of the National Oil and gas Authority, including the setting up of the Oil and Gas Holding Company in 2007 with a capital of $4.8bn, the project for developing Bahrain's refinery by means of investments amounting to $5bn over a period of 10 years. This project, Dr Mirza said, included updating, developing and adding new production and refining units to improve the refinery and upgrade oil products to a world- class status, He also mentioned the project of prospecting for natural gas in the deep layers of the Bahrain (gas) field.

H.E. Sufian Al-Allaw, the Syrian Minister of Oil and Mineral Resources, stressed his country's support for Arab cooperation plans in all spheres, especially energy, out of conviction in the importance and benefits of such cooperation. He pointed out that Syria's geographical location qualified it to be a regional and international meeting point of oil, gas and electricity lines, Mr Allaw recalled Syria's contribution to many important Arab linking projects, including the Eight-Fold electrical interconnection project, the Arab Gas Pipeline, in addition to future plans to link the Arab Gas Pipeline to the Turkish gas network and link the gas pipelines from Qatar and Saudi Arabia to the Arab Gas Pipeline. Mr Allaw outlined the main features of the oil and gas sector in Syria, adding that Syria's production of natural gas amounted to 1bn cubic foot per day and was expected to reach 1.25bn cubic foot per day by the middle of 2011. Memoranda of understanding were signed with Turkey, Iran, and Azerbaijan to import natural gas from these countries, in addition to natural gas imported from Egypt at the rate of 2.5m cubic meters per day. In the oil sector, Syria invited international bids for exploration in eight blocks covering 40% of Syrian territory. Work was also under way to develop production from old oilfields in cooperation with some international specialized companies.

H.E. Dr Chakib Khalil, the Algerian Minister of Energy and Mining, outlined the most important achievements of the energy sector in Algeria, saying that the value of investments in the oil and gas sector amounted to 20^{bn} in the previous 10 years. Oil production in Algeria was 1.4m b/d, compared to 890,000 b/d in 2000. Natural gas production amounted to about 85bn cubic meters per year, of which 60bn cubic meters were exported. Dr Khalil added that the new tendency in the fuel development policy now allowed international energy companies to work in prospecting and production projects in Algeria, which took the number of international companies working in the oil and gas sector in that country to more than 30, Dr Khalil said. This policy led to raising production of crude fuels and developing electricity generation by 6%, which translated into 43 terawatts /hour in 2009, compared to 25 terawatts/hour in 2000.

H.E. Khaled Irani, the Jordanian Minister of Energy and Mineral Resources, praised Arab successes in the field of energy, most notably the electrical interconnection networks and oil and gas lines across many Arab countries, in addition to Arab coordination and integration within the framework of OAPEC. Mr Irani discussed energy projects in Jordan aimed at overcoming the shortage of energy sources. He said that his country faced the same challenges and difficulties as the energy sector in most Arab countries, namely, the rapid rise in demand for energy and the weak link between the economy and the demand for energy.

H.E. Mohamed bin Dhaen Al-Hamli, the UAE Minister of Energy, stressed that the Ninth Arab Energy Conference was being convened at a juncture when global economy was witnessing many developments and most countries were trying to reverse the setback caused by the international financial crisis, which had a clear impact on the energy sector. He expressed the hope that the Conference would reach results that would help to make the Arab region a pioneer in supporting and developing the global oil industry. The UAE energy policy, he said, aimed at stabilizing global oil markets to benefit both producers and consumers, contribute to global economic growth, stabilize prices, balance supply and demand and achieve energy security in the world.

Mr Al-Hamli went on to say that the UAE oil reserves amounted to around 97.8bn barrels by the end of 2008, which was 9.6% of global reserves. The UAE natural gas reserves amounted to 6.06bn cubic meters, which made them the third biggest in the Arab region after those of Qatar and Saudi Arabia and the fifth in the world. He pointed out that the UAE looked to draw up a nuclear energy programme for peaceful purposes in order to meet the rising local demand for electrical energy. Nuclear energy was expected to account for 15% of the total energy produced in the UAE by 2025. In his view, developing renewable sources of energy was a basic necessity for extending the duration of fossil energy, protecting the environment and preparing for the post-oil age.

Mrs Amina Benkhadra, the Moroccan Minister of Energy, Minerals, Water and the Environment, outlined the new energy policy in Morocco, which depended on expanding the use of renewable energy in order to meet the increasing demand for energy, protecting the environment and cutting energy imports from outside the country. The new strategy, she said, focussed on many objectives such as supplying energy for reasonable prices, curbing the rising demand for energy and acquiring advanced technology and controlling its use. In order to reach these goals, the strategy focussed on increasing the share of renewable energy in the energy balance, adopting energy efficiency as a national priority and developing Moroccan human resources in the field of energy.

H.E. Awadh Sa'ad Al-Saqtari, the Yemeni Minister of Electricity and Energy, set out his country's vision in the field of electrical energy and oil, together with its plans for using different sources of energy. In his opening speech, Mr Al-Saqtari outlined his country's plans and strategies with regard to diversification of energy sources and its efforts in oil exploration, increasing electricity networks, implementing his Ministry's plans for raising the total capacity of power stations to produce 1400 megawatts by 2012.

This was followed by the speech of Mr Muhammad Kamil Al-Zandah, Member of OAPEC's Executive Bureau, who looked back at the history of oil discovery in Libya and the experience of his country in oil since 1958 until the present time. He said that the Libyan oil industry was affected by the sanctions imposed on it, which caused oil production to fall to its lowest levels in 1984, reaching 1.131m b/d before rising to 1.580m b/d in 1990. Mr Al-Zandah outlined his country's efforts in oil exploration, production and oil contracts awarded in the few previous years to international companies who directly offered their bids at a general meeting. He added that Libya was still negotiating with a number of these companies wishing to enter the Libyan oil market. Mr Al-Zandah went on to review the leading energy projects in Libya aimed at increasing oil reserves and boosting investment returns. He ended his speech by noting the good results achieved in this respect by national and international companies working in Libya.

H.E. Karim Wahid, the Iraqi Minister of Electricity, referred in his opening speech to future plans to develop the energy sector in Iraq with a view to achieve optimal benefit from the big oil reserves in that country. He mentioned Iraq's efforts to reach self-sufficiency in electrical energy by 2012 and the challenges faced by the Iraqi energy sector. He mentioned the leading projects in Iraq at present and in the future, including those aimed at developing exploration activities to increase oil and gas reserves and others to develop refineries and increase the capacity of electricity generation installations. At the end of his speech, Mr Wahid mentioned the promising investment opportunities in the Iraqi energy sector, which could be exploited in cooperation with international energy companies.

For his part, Mr Muhammad Rifa'at Khafagi, First Under-Secretary for Exploration Activities, Ministry of Oil and Mineral Resources, Egypt, discussed the challenges facing the oil and gas industry as a result of the international financial crisis, including sharp fluctuations in oil prices besides the slackening flow of investments to secure oil supplies, in addition to difficulties in the refining sector. In his speech, Mr Khafagi stressed the importance of dialogue between producers and consumers and made the point that Egypt took an active part in all international meetings and forums specialized in energy such as the International Energy Forum and the Gas Exporting Countries Forum, in addition to attending OPEC meetings as an observer. Mr Khafagi added that the oil sector in Egypt had achieved positive results in the previous 10 years, with the remaining reserves of crude oil, condensates and natural gas rising to 18.3bn barrels of oil equivalent (BOE) and average energy production rising to 1.9m barrels of oil equivalent per day.

Conference proceedings also included panel discussions and four technical sessions, all of which are summarized below:

First Panel Discussion

The first panel discussion, held on 9 May 2010 and chaired by H.E. Ali bin Ibrahim Al-Naimi, the Saudi Minister of Oil and Mineral Resources, dealt with the topic of 'International Developments in Oil and Natural

Gas Markets and their Impact on Arab Countries.' The main paper was prepared by Mr Christopher Allsopp, Director of the Oxford Institute for Energy Studies, in collaboration with Mr Bassam Fattouh, researcher at the Institute. In his paper, Mr Allsopp reviewed the most important developments in the oil and gas markets since the Eighth Arab Energy Conference, held in May 2006. The lecturer said that in 2006 world economy saw remarkable stability, rise in economic growth and a fall in inflation rates after the rise of inflation seen at the beginning of the new millennium, with China and India accounting for most of the rise in demand for oil. He noted that geopolitical conditions in the Middle East had a great impact on oil and gas markets. The international financial crisis, which began in the middle of 2008, was an unexpected shock that led to the loss of 5-6m b/d in demand, compared to the demand levels that were expected for 2010-2011. This led to a rise in the surplus of production capacities and dampened optimism as a result of falling global demand for energy and the cancellation and postponement of some projects.

The lecturer said that expectations in respect of the future of global oil and gas markets in the long run oscillated between optimism and uncertainty as to oil prices, which were expected to rise from an average of $70-75 per barrel in 2008 to $130 per barrel by 2030. He added that there was also a state of uncertainty as to future global demand for oil as a result of the policies of the leading industrial nations with regard to expansion in the use of renewable energy sources and the possible competition to oil from gas and electricity in the transport sector.

The lecturer expected an accelerated move by the leading industrial nations away from oil in favour of renewable energy sources by means of levying more taxes on oil products and seeking to reduce the price differentials between oil and renewable energy. Such policies, he added, had a cumulative effect and might lead at the end of the day lead to increasing uncertainty as to the levels of future global demand for oil while having a limited effect in the short run.

The lecturer then discussed the gas market and called for a re-evaluation of those markets in the light of new developments such as falling demand for imported gas because of technological advances that made it possible to extract gas stored in shale vis-à-vis an oversupply of gas ready for export because of the implementation of gas liquefaction projects (LNG) and the glut in major gas markets like that of North Western Europe. The lecturer explained that gas was the favourite fuel for electricity generation and water desalination in the Middle East and North Africa. Qatar was an exception in the liquefied gas industry in that while the world suffered from the crisis, it increased its production capacity and supplies, a trend that would continue to rise

The lecturer reviewed the gas projects in member states of the Gulf Cooperation Council (GCC), most notably the Dolphin Gas Project, undertaken by the UAE, Oman and Qatar, and the announcement by Kuwait, Dubai and Bahrain of their intention to import liquefied gas to meet rising local requirements. The lecturer expected those countries to move towards importing (gas) from Qatar while Saudi Arabia was expected to succeed in the process of exploration of unaccompanied gas.

In the last section of his lecture, Mr Allsopp discussed the challenges facing Arab countries in the field of energy such as the need to diversify their economic base, develop the industrial sector, together with the services, IT, investment, training and education sectors. He concluded by saying that the emerging economies would be the engine driving world economy and that called for focussing on expanding energy markets, continued dialogue between energy producing and importing countries. He added that present and future demand for electricity in the Middle East was concentrated in a small group of countries, namely, Iran, Saudi Arabia, Qatar, the UAE, and Egypt.

The following panellists took part in the discussion following the lecture:

Dr R.K. Pachauri, Director General of the Institute of Energy and Resources, India, who focused in his input on climate change and its

repercussions on Arab countries. He warned against continued rise in oil, gas and water consumption levels in Arab countries and its negative effects on the economy, the environment and security. Dr Pachauri enumerated the challenges facing Arab countries such as continued population growth, migration from the countryside to cities and the possible effect on agricultural land on the one hand and crowding of cities on the other. He pointed out that success in mitigating the effects of climate change depended on such factors as the ability to change lifestyles, meet environmental standards as well as on the extent of technology availability. He noted some pioneering projects in the Arab region such as the Masdar project in the UAE and the Dukhan Desert project in Qatar.

H.E. Abdalla El-Badri, Secretary General, OPEC, who referred in his input to the important developments that took place in the oil market in the previous few years as a result of two main factors: firstly, the international financial crisis and the attendant economic slow-down; secondly, the inability of oil markets to predict price dynamics with any degree of precision. He explained that the fall in global demand for oil and gas in 2008-2009 was the first to occur since the early 1980's and that the oil markets saw an improvement in 2010 as a result of some good indicators in world economy. He added that about 1.5b people suffered from energy poverty and that 205bn people depended on some kind of solid fuels for cooking and heating. He called on Arab countries, international organizations and development funds to help in enabling those people to overcome the problem of energy poverty. Finally, Mr El-Badri talked about OPEC and the role it played for over t0 years since its founding.

H.E. Christopher Frei, Secretary General of the World Energy Council, who looked at the role played by the Council since its founding as an assembly for reinforcing dialogue on energy matters by means of holding seminars and arranging meetings for world leaders who influenced the energy industry in order to bring different viewpoints together on matters related to the future of energy in the world

Mr Nabuo Tanaka, Executive Director, International Energy Agency (IEA), who said that emerging economies were the main driving force for global demand for energy and that countries from outside the Organization for Economic Cooperation and Development (OECD) were responsible for 93% of the total rise in global demand for primary energy and for all the rise in the total global demand for oil that was expected to increase from 85m b/d in 2008 to105m b/d in 2030. He finally pointed out the need to inject huge investments into the oil and gas industry to face probable fall in reserves.

Mr Tanaka discussed oil production in 2030 from the perspective of the International Energy Agency, known as the 450 scenario, which aimed at drawing up a time scale for the measures needed to curb the concentration of greenhouse gases in the earth's atmosphere in the long run and bring it to 450parts out of 1000,000 parts of carbon dioxide equivalent and maintain the concentration of the greenhouse gases at this level, which would limit the rise in temperature in the world to 2 centigrade. According to this scenario, it would be possible by 2030 to invent a low carbon energy technology to produce 60% of the electricity in the world from renewable sources of energy (37%), nuclear energy (18%), energy stations equipped with carbon capture and storage technologies (5%). This would coincide with the global trend to use hybrid and electric cars that would account for 60% of total cars, considering that these cars account for no more than 1% of total cars at present. Mr Tanaka pointed out that demand for gas would continue to rise, with gas production reaching its highest level in 2025. He added that the energy generation sector would account for most of the rise in demand for gas. Finally, Mr Tanaka called on Arab countries to lower their oil and gas consumption, increase energy use efficiency, diversify their sources of energy and inject more investments into the energy sector in order to curb greenhouse gas emissions.

H.E. Noe van Hulst, Secretary General, International Energy Forum, who spoke on the outcomes of the Twelfth International Energy Forum, held in Cancun, Mexico, with the theme @Cooperation and Partnership between National and International Oil Companies to Face the Industry's

Challenges'. He said that the Forum aimed at encouraging dialogue between producers and consumers and reinforcing transparency in the energy market by holding dialogue sessions between top government officials and the private sector in the world.

First Technical Session

The first technical session, held on 10 May 2010 and chaired by H.E. Abdul Hussain Ali Mirza, centred round the topic 'Energy Sources in Arab Countries.' Four papers were presented at the session.

The first paper, Energy Resources in Arab Countries, was presented by Mr Torki Al-Hemsh, Petroleum Exploration and Production Expert, Technical Affairs Department, OAPEC. A summary of its main points follows:

The lecturer began by reviewing different energy sources, traditional and untraditional, as well as sources of renewable kinds of energy. He then outlined the activities of exploration and production of crude oil and natural gas and gave their reserves in Arab countries and the rest of the world. He explained methods of improved oil recovery and the role of this technology in maximising reserves. He also explained the developments taking place in drilling activities. Next, the lecturer talked about coal and uranium, moving on to untraditional sources of oil such as shale oil, very heavy oil and tar sands. The lecturer then outlined renewable energy sources such as hydroelectric energy, wind energy, solar energy, geothermal energy, biomass energy and tide and ocean energy. The lecturer pointed out that the Arab region possessed no less than 57.8% of global oil reserves, estimated in 2009 at over 1178bn barrels and had 28.9% of the world's proven natural gas reserves, estimated at the end of 2009 at around 187 trillion cubic meters. Furthermore, there were as yet undiscovered reserves estimated at around 269bn barrels of oil and around 43 trillion cubic meters of natural gas in Arab countries combined. The lecturer went on to say that in the period 2006-2009, Arab countries produced around 33bn barrels of oil while estimates of their reserves rose in the same period by around 1.6bn barrels of oil. Member countries of OAPEC produced around 28.2%

of all hydrocarbon liquids in the world in 2009 while combined production of hydrocarbon liquids by Arab countries accounted for 30.2% of total global production in the same year.

The lecturer said that quantities of natural gas marketed in OAPEC member countries exceeded 400bn cubic meters in 2008, which represented a rise of about 100bn cubic meters over those of 2004. In Arab countries as a whole, these quantities rose from 323bn cubic meters in 2004 to around 430bn cubic meters in 2008. Qatar's share of this increase was 37%, followed by Egypt with around 26%, then Saudi Arabia with 14.5%. Drills operating in Arab countries (both onshore and offshore) totalled around 600 in November 2008, but fell to around 500 drills in the same month in 2009. En bloc, Arab countries made around 369 oil and natural gas discoveries between 2006 and 2009, broken down into 227 oil discoveries and 142 gas discoveries.

Besides oil and gas, the lecturer went on, Arab countries possessed some solid energy sources like shale, found in Jordan, Syria, Egypt and Morocco. There were also depositions of tar sands in the Bishri region in east Syria and kerogen-rich deposits in the Qasir region in Egypt. Arab countries, the lecturer said, were seeking to raise their production capacities to meet growing global demand for oil while some Arab countries moved towards accelerating the rate of prospecting for untraditional gas as the Arab region had many untraditional gas fields within low-porosity rocks as in Jordan, Algeria, Syria, Egypt, Iraq and Oman. There was also a trend in Arab countries to increase the share of renewable energy sources, especially wind energy and solar energy. Some Arab countries were building nuclear reactors for electricity generation, in addition to some experiments at using geothermal energy, the lecturer said.

The second paper, Business Environment of Refining and Petrochemicals Industries: Future Prospects from the Perspective of Aramco, Saudi Arabia, was presented by Mr Abdullah Bin Mohammed Al-Qarni, Business Development Consultant, Aramco, Saudi Arabia. It posited that refining and petrochemicals industries had faced continued challenges throughout

the previous decade in an environment of rapid growth rates that were nevertheless subject to oscillation and irregularity. Continued rise in demand for fuels used in transport, estimated at 1.3m b/d in 2003-2007 and continued rise in demand for poly olivine derivatives, estimated at an average of 3.2m tons a year in 2004-2007, led to a huge increase in trade among different regions of the world as well as to unprecedented rates of operation in refineries in both industries.

To support this argument, the lecturer offered some figures to the effect that in the refining sector, a consistent global operation rate of 85% was recorded in 2004-2006, which was an unprecedented rate in the previous twenty years. In the petrochemicals sector, exploitation rate of ethylene production capacity reached its highest level of 94% in 2004, which was only matched in 1999 when global ethylene production capacity was 20% less than in 2004 (110m tons a year, compared to 90m tons a year). In such positive and optimistic business environment, supported by continued rise in demand in emerging economies like China, India and Brazil, together with encouraging profit margins, many projects were announced that aimed at increasing production capacity. A case in point was the announcement of plans to build about 275 refineries around the world, which would raise the capacity of crude oil distillation by more than 34m b/d by 2017 worldwide, i.e., by 3.8m b/d a year. Growth in the petrochemicals industry was not less fortunate, the lecturer said. By 2007, the declared increase in ethylene production capacity had exceeded 50m tons a year by 2015, which meant an increase of 6.3m tons a year, compared to a growth of less than 3.5m tons a year in the previous decade.

So it became obvious in industrial circles, the lecturer went on, that a large part of the announced new projects would not see the light of day or would otherwise be postponed for some years. The international financial and economic crisis arrived in 2008, causing a drastic change in the business environment. It halted the increase in demand for hydrocarbon products altogether and without any warning in 2008. Demand even fell by 1.54m b/d in 2009 while demand for olivine derivatives fell back to its 2003 level, which meant a decrease of more than 20%. Those developments

intensified competition in a market that was shrinking in size and profits, which made it necessary to cancel or postpone some projects and hurried the closure of low-profitability and uncompetitive manufacturing facilities in the USA and Europe, the lecturer explained.

As for future developments, Mr Al-Qarni said that refinery profits were expected to remain low over the following four or five years, with a slight recovery in demand expected from 2010 and the few following years. As for profits in the petrochemicals sector, the downward cycle was expected to continue and reach its lowest level by 2011, with production capacity shrinking more in 2010 and 2011.

The lecturer noted that although counties in the Middle East were not totally isolated from the big changes in the business environment, that region continued to be replete with opportunities, compared to other regions in the world, thanks to a number of basic positive factors at play. These included availability of feeds with a competitive edge that allowed for continued development of competitive economic projects, in addition to continued rise in local demand for hydrocarbon products in transport, electricity and water sectors in the region; geographical proximity to regions driving global demand such as China and India; the strategic commitment on the part of governments in the region to remain a credible source of energy supplies (i.e., crude oil, refined products, liquefied natural gas and a large group of petrochemical products) to the rest of the world. As for other parts of the world, the lecturer went on, environmental systems in markets of the developed countries like the United States and the European Union practically destroyed any chance of starting new production facilities, which forced investors to move their projects either to consuming markets (China) or to where raw materials came from (the Middle East).

To put some detail on this aspect, the lecturer stressed that Saudi Arabia would remain the most attractive place for starting hydrocarbon products and petrochemicals projects. In that country, two projects were awarded to contractors to build two new refineries using deep transformation technologies with a 400,000 b/d capacity each and were to become

operational by 2013. Plans were being made to build two other refineries with a 400,000 b/d capacity each. These two projects were still at the initial stages of engineering design, the lecturer said, but the first was expected to become operational by 2015 and the second by 2016. These two hi-tech, highly integrated refineries would produce petrochemicals as well and would meet the local demand for different kinds of fuel, in addition to supplying the global market with more than 1.3m bpd of car and locomotive fuel. At the same time, modifications to the present refining infrastructure would be carried out to enable these two refineries to produce fuel by 2014 with new specifications for the Kingdom that allowed for lower levels of sulphur and aromatic compounds content.

In the petrochemicals sector, the lecturer said, Saudi Arabia would continue to implement programmes for starting new highly competitive production projects. The period 2010-2016 was expected to see additions to production capacity of more than 4m metric tons of ethylene a year (a 31% rise) and 2m metric tons of propylene a year (a 40% rise). These additions would be accompanied by manufacturing greater amounts of advanced petrochemical compounds related to the big increases in liquid fractionation capacity. All these initiatives were consistent with the efforts made by the Kingdom to develop many local industrial complexes that would transform 30% of the new products into specialized commodities and final products, the lecturer finally said.

The third paper, Natural Gas Industry and Markets, was presented by Mr Khalid Al-Hatmi, Director, Gas Development Department, Qatar Petroleum. The lecturer began by reviewing natural gas reserves in the world, Arab countries and locally in Qatar. He then moved on to discuss developments in the field of producing this material, which had become the subject of great interest because of its being environment friendly. The lecturer then compared consumption in Arab countries to that in the rest of the world. He mentioned untraditional sources of gas and their competition to natural gas. He then went into some detail on the strategic projects implemented by Qatar in the field of liquefied natural gas, the process of liquefaction and prospects of marketing the huge amounts produced

through pipelines to countries in the region since transportation of gas to the UAE and Oman was considered a cornerstone of Arab cooperation. Qatar also transported gas to global markets by tankers, the lecturer said, adding that Qatar now owned the largest fleet of such tankers in the world. The lecturer finally touched on issues of marketing and features of global gas markets.

The Fourth Paper, The Role of Nuclear Energy and Renewable Energy In Electricity Generation, was presented by Dr Adnan Shehab Eldin, Consultant, National Nuclear Energy Commission, Kuwait. The lecturer began by saying that for many years nuclear energy had become the subject of increased interest for being one of the most important sources of clean energy available to meet rising global demand for electricity. After two decades of stagnation and waning interest in its role, the lecturer said, it was now almost unanimously accepted that nuclear energy was on the verge of a second era of boom referred to as the 'Nuclear Renaissance'. He then took a historical look at rates of growth in demand for electrical energy globally and regionally and discussed the expected development of electrical energy in the foreseeable future. He explained that the main impetus behind the 'Nuclear Renaissance' were considerations of energy security and the global concern over climate change, caused by increased carbon dioxide emissions resulting from the burning of fossil fuel, in addition to rising rates of demand for electrical energy, especially in developing countries.

The lecturer highlighted the main advantages of nuclear energy, namely, lack of carbon dioxide emissions, low cost of nuclear electricity production in the previous 30 years, compared to other energy sources, where cost was expected to rise in the light of the expected rise in oil and gas prices in coming decades. The lecturer then reviewed the leading existing and planned nuclear energy programmes in the Arab world and pointed out possible areas of regional and quasi-regional beneficial cooperation in this respect.

In the third part of his paper, the lecturer dealt with the increasing interest in renewable energy reflected in very high growth rates. He analysed the

factors underlying this rapid growth as well as the constraints and factors that might impose a ceiling on the share of renewable energy in total energy sources used in electricity networks. The lecturer explained that solar energy and wind energy were the most important promising sources of renewable energy in Arab countries. He outlined the main features of the leading initiatives, policies and programmes of renewable energy in Arab countries and discussed the future role of renewable energy in Arab countries in the light of the cost of generating electricity from different sources.. He also discussed national and global policies, both present and expected, making a few recommendations on the future of electrical energy in the Arab world, taking into account all sources of electrical energy, including nuclear energy and renewable energy.

Second Technical Session

The second technical session, held on 10 May 2010 and chaired by Mr Muhammad Bin Dhaen Al-Hamli, centred round the topic Energy Consumption and Possibilities of Its Rationalization. Four papers were presented at the session which are summarized below:

The first paper, Energy Consumption in Arab Countries: Past and Future, was presented by Mr Abdul Fattah Dandi and Mr Tahir Al-Zaitoni, Economic Researchers, OAPEC. It was read by Mr Dandi, who looked at consumption of different sources of energy in Arab countries, where energy consumption rates rose from 3.9m barrels of oil equivalent per day in 1985 to 10.4m b/d in 2009, i.e., by 4.2% a year. Mr Dandi noted the remarkable rise in demand for natural gas in Arab countries, compared to the decrease in the share of oil in that total although oil still came first in respect of demand for energy. He added that the share of oil and natural gas still accounted for 96% of energy consumption in the Arab world in the previous quarter of a century, a period that saw Arab consumption of oil products rise from 2.6m barrels of oil equivalent per day in 1985 to 5.4m barrels of oil equivalent in 2009, which was an annual 2.8% growth rate. Natural gas consumption in Arab countries showed a remarkable rise from 1.1m barrels of oil equivalent per day in 1985 to 4.6m barrels of

oil equivalent in 2009, i.e., by 6.2%. The considerable rise in natural gas consumption came at the expense of oil products, with the share of natural gas rising from 28.3% of total consumption in 1985 to 44.7% in 2009 while the share of oil products fell from 66.1% to 52.1% in the same period.

The lecturer drew attention to the fall in local energy consumption vis-à-vis energy production in Arab countries, i.e., from 28.8% in 1985 to 24.6% in 1995, with a rise to 28.6% in 2008. In spite of the rise in energy consumption in Arab countries in the period 1985-2009, these countries succeeded in lowering the energy density indicator from 2.8 barrel for every $1000 in 1985 to only 2 barrels for every $1000 in 2009. He also pointed out that the industrial sector was the main energy- consuming sector in Arab countries, with its share accounting for 42.3% of total final energy consumption in 2006. The transport sector came second with a 33.5% share, while the share of other sectors (domestic, commercial and agricultural) amounted to 24.2%. The lecturer explained that many factors contributed to the rise in energy consumption in Arab countries in the period 1985-2009, including economic and population growth. As for future consumption of different energy sources in Arab countries up to 2030, total energy consumption was expected to rise to 20.8m barrels of oil equivalent per day in 2030, compared to 10.4m barrels of oil equivalent per day in 2009, i.e., at a growth of up to 3.3%. The lecturer added that growth rates in total energy consumption in Arab countries were expected to exceed their counterparts in the rest of the world in the period 2009-2030. This would raise the share of Arab countries in overall global energy consumption by a range between 5.6% (in case of low growth) and 7.7% (in case of high growth).

The lecturer went on to say that natural gas consumption in Arab countries was expected to rise at a rate of 3% a year from 2009 to 2030. Growth rates in overall natural gas consumption in the Arab world were also expected to exceed their global counterparts. This would raise the share of Arab countries in overall global energy consumption from 8.5% in 2009 to a range between 10.8% (in case of low growth) and 14.1% (in case of high growth). Oil products and natural gas were also expected to

retain their present shares in the energy combination in Arab countries, i.e., around 52% and 44% respectively after the share of natural gas started to rise at the expense of that of oil products since 1985. Average individual energy consumption in Arab countries was expected to increase at an annual rate of 1.7% between 2009 and 2030, thereby exceeding the estimated global rate of increase by less than 1% (.5%). This meant that the individual share in Arab countries would reach 12.8 barrels of oil equivalent in 2020, then 15.9 barrels of oil equivalent in 2030, compared to 11.2 barrels of oil equivalent in 2009. The lecturer also pointed out that results indicated a noticeable variation in internal demand flexibility and that of price demand related to energy consumption.

The second paper, Rationalization of Energy Consumption in Arab Countries: Motives and Economic Impact, was presented by Dr Mohamed Al-Haouari, Director, Industrial Development Department, Arab Industrial Development and Mining Organization, who began by saying that interest in rationalization of energy consumption in the Arab region was one suitable approach to control energy exploitation and transformation on the one hand and fulfil international obligations to mitigate the effects of climate change on the other. He added that the previous ten years had witnessed a noticeable development in demand for energy in the Arab region as a result of economic and social developments in the region. For example, demand for energy rose from around 6.5m barrels of oil equivalent per day in 2000 to around 10m barrels of oil equivalent per day in 2008, which was an average annual rise of 5.5%. This, he said, was a big rise, compared to the rate of rise in global demand for energy, which was around 3.8% only in the same period. The lecturer pointed out that average individual energy consumption in Arab countries reached around 10.9 barrels of oil equivalent per day in 2008, which was less than the global average of 11.5 barrels of oil equivalent. Overall demand for energy in Arab countries reached 10m barrels of oil equivalent per day in 2008, which represented 4.7% of global demand. The lecturer explained that energy consumption rationalization depended on two main factors: firstly, wise management of resources and places of consumption by means of optimal building, compound and city design, now known as green buildings and cities that

made maximum use of natural lighting and heating, encouraged walking, brought services closest to citizens and rationalized transport to the utmost; secondly, increasing the efficiency of systems and equipment used for exploiting and diverting energy from the transport sector , lighting, air conditioning and electricity generation.

The third paper, Policies of Fuel Rationalization in the Transport Sector and their Repercussions on Global Demand for Oil, was presented by Mr Olivier Appert, Chairman of the Board and CEO, Institut Français du Pétrole, who gave an overview of energy consumption in the transport sector and the measures aimed at improving energy efficiency. He said that consumption in the transport sector accounted for more than 50% of overall global oil consumption. According to the International Energy Agency, he added, overall global demand for oil in the transport sector would rise by 18m b/d between 2007-2030, He pointed out that improving energy use efficiency was a priority for decision makers in the leading industrial countries and a major challenge to the international energy industry. The lecturer reviewed international efforts aimed at improving energy efficiency, which had seen a noticeable development in all countries since 1980, especially in the motor industry, which showed a 20% improvement. He referred to variations in the rate of consumption among countries, citing the fact that cars in the United States used 35% more fuel than those in Europe. He attributed the variation to taxes levied on fuel, individual income and type of vehicle. The lecturer expected a considerable fall in fuel consumption rates in cars in future decades, noting that the Institut Français du Pétrole had devised a scenario for future global demand for energy in the transport sector.

The fourth paper, Energy Consumption in the Electricity Sector in Arab Countries, was presented by Mr Fawzi Kharbat, Secretary General, Arab Electricity Union, who began by saying that amounts of fuel needed in the electricity sector in Arab countries constituted a heavy burden on many of these countries in terms of difficult access or exorbitant cost. He called on Arab countries to integrate future projects for new and renewable sources of energy into their national plans for expanding electrical energy production in

order to meet future demand, a measure that would significantly reduce the amounts of fuel consumed in the electricity sector. He also called on Arab countries to attach more importance to programmes of managing electricity loads, energy conservation and reducing electric losses because that would have a great impact on reducing fuel consumption and emissions affecting the environment. The lecturer finally called for creating a common Arab electricity market to maximise benefit from electrical interconnection

Second Panel Discussion

The second panel discussion was held on 10 May 2010 and chaired by H.E. Dr Chakib Khalil, Minister of Energy and Mining, Algeria. It discussed the paper Prospects and Risks of Investment in Oil and Natural Gas Projects in Arab Countries, presented by Dr Ali Aissaoui, Senior Consultant, Arab Petroleum Investment Corporation (APICORP). The lecturer began by looking at the current circumstances affecting global credit and oil markets and their impact on investments in the energy sector in the Arab world. He divided his presentation into three parts, the first of which dealt with the different dimensions of the credit and oil crises. In the second, he gave an evaluation of the impact of the two crises on global and regional economies; and in the third he dealt in depth with the impact of the two crises on expected investments in the energy sector in the Arab region in the foreseeable future.

Dr Aissaoui said that more than two years had passed since the credit crunch descended upon the world in the summer of 2007, but money markets were still reeling under its complications and after-effects. Investments were receding under the expectation that weaknesses would continue to beset the world economy. However, things were different in the Arab region as a result of the returns it reaped because of the rise in oil prices until the middle of 2008, when the belief prevailed that the Arab region would escape the consequences of that crisis. But the sharp fall in oil prices that followed, together with continued constraints on bank lending soon produced negative effects on the economic and investment outlook in the field of energy in the region.

The lecturer went on to say that faced with this difficult situation, leaders in this sector had to adapt their institutions to the crisis, and there was no option for those responsible for energy policies in Arab countries, investors and advocates of projects but to re-evaluate their investment strategies and reduce the budgets allocated to projects, and so the upward trend of the previous years was reversed. The lecturer predicted a reduction in the size of expected capital investments in 2010 –2014, mainly because of the expected downscaling of all projects. He also stressed that the fall in the actual need for capital was set to continue due to cancellation and postponement of projects that had become unfeasible or lacked available funds.

Dr Aissaoui added that structuring funding for the remaining projects generally tended towards more self-funding while the cost of borrowing to fund downstream industries projects remained high. In the light of the foregoing facts, the increase in measures taken to hedge risks and the noticeable stringency in lending conditions, taking out the required loans became more difficult than ever before. Therefore, the lecturer made recommendations on investment policies that dealt with four main points:

Firstly, Arab governments should continue to compensate for the reversal in the flow of external investments into the region by reinvesting their assets held outside their countries in sovereign funds.

Secondly, making liquid assets available and boosting funding for regional financial organizations working in Arab countries and directing these funds to organizations concerned with developing oil and energy industries because such industries were a powerful driving force for economic and social development in the region.

Thirdly, while going about reviewing their investment strategies, Arab countries should exclude projects in the electrical and hydroelectric energy sector, whether public or private, from the option of postponement.

Fourthly, in the light of increased hedging of risks and its negative effect on availability of funding and its high costs, the best policy to follow was

to work to minimize risks.

The following panellists took part in the discussion that followed the lecture:

H.E. Rasheed Al-Muraj, Governor, Central Bank of Bahrain, who talked on the challenges of funding energy projects arising from stringent lending conditions imposed by banks as a result of the international financial crisis. He said that the tendency of banks to secure more financial collateral would slow down the momentum of the private sector embarking on energy projects. He drew attention to the phenomenon of Islamic funding of economic activities, especially in the Arabian Gulf region and pointed out the existence of some promising opportunities to obtain Islamic finding for energy projects. Mr Al-Muraj added that Islamic funding institutions still faced some legal constraints, compared to traditional funding institutions. Finally, he called on Islamic funding institutions to develop their funding products in order to remove the legal obstacles facing them.

H.E. Abdlatif Y. Al-Hamad, Director General, Chairman of the Board, Arab Fund for Economic and Social Development, who said that the sharp rise in oil prices had negative effects on the economies of producing and consuming countries in the long run. He added that official bureaucracy in some oil-exporting countries also had a similar effect on the oil industry and caused massive financial losses to states. Decisions in the oil industry, he continued, should be taken in the light of good reading of economic conditions in the long run. To prove his point, Mr Al-Hamad cited some projects that were constructed in some oil-exporting countries at the time of the sharp rise in oil prices in early 2008 only to be postponed or cancelled as a result of the international financial crisis and poor funding. Finally, Mr Al-Hamad called on Arab countries to develop their economies and focus on human resources development, education and diversification of energy sources.

Dr Ali Abbas, Director General, General Petroleum Corporation, Syria, who said that the international financial crisis impacted Arab countries in varying degrees depending on the extent of their relations and the volume of

their trade with the outside world. He reviewed some of the repercussions of the international financial crisis on Arab countries such as shrinking of the Arab exports market, the fall in travel and tourism revenue, falling remittances by expatriates, the big losses in sovereign funds and shares markets, all of which led to a fall in the rate of economic growth, ebb of cash flow, cancellation or postponement of many energy projects. Dr Abbas divided Arab counties into two groups depending on the impact of the international financial crisis on them. The first group was the oil-exporting countries whose economies were based on the free market; the second group was the oil-exporting and non oil-exporting countries whose economies were less open. Dr Abbas called on Arab countries to inject more investments into the oil and gas sectors to make up for lacking or receding private sector investments and stringent lending policies by funding institutions. He also called on them to invest in alternative energy sources, devise new legal frameworks to attract and encourage investments and finally support cooperation among Arab countries in the field of energy.

Third Technical Session

The third technical session was held on 11 May 2010 and chaired by H.E. Abbas Ali Al- Naqi, Secretary General, OAPEC. The topic to be discussed was 'The Environment and Energy for Sustainable Development.' Four papers were presented at the session.

The first paper, Energy for Sustainable Development: Opportunities and Challenges, was presented by Mr Suleiman J. Al-Herbish, Director General, OPEC Fund for International Development, who mainly focussed on energy poverty and energy for the poor, an issue that was at the centre of the OPEC Fund's activities. He said that the issue of eliminating energy poverty was added to the Millennium Goals and that lack of energy jeopardized those goals. Mr Al-Herbish discussed the decisions of the Third Summit of Heads of States and Governments of OPE, which stressed that energy was necessary for eliminating poverty and that the above-mentioned states were part of all international efforts aimed at bridging the development gap between rich and poor countries and give states

free access to energy sources. The lecturer explained that the problem of energy poverty in Africa and South Asia was considered a major challenge to the international community. He stressed that global concern over climate change should be translated into financial and technological aid to poor and poorer countries. He drew attention to the fact that eliminating energy poverty required political, economic and administrative reforms in poor countries as well as cooperation between public and private sectors within those countries suffering from difficult conditions, in addition to the necessary aid from international development agencies. The lecturer finally reviewed the leading projects carried out by the OPEC Fund for International Development (OFID) to help poor countries in agriculture, funding trade and transport as well as in health, education and human resources development.

The second paper, Developments in the UN Framework Convention on Climate Change, was presented by Dr Mohammed Suroor Al-Sabban, Advisor, Ministry of Oil and Mineral Resources, Saudi Arabia. The lecturer began by reviewing the historical development of international efforts to face climate change, which began after the publication of a scientific report in late 1980s. This report referred to the rise in the earth's temperature and the increase of greenhouse gases emissions, linking the rise in temperature to that of human activities. Dr Al-Sabban pointed out that those statements in the report were inaccurate because most of the rise in the earth's temperature took place before the industrial revolution. He went on to say that international negotiations on climate change began after 1991, more specifically in the Earth Summit in Brazil in 1992, the Kyoto Protocol in 1992, the Bali Summit in 2007 and the Copenhagen Summit in 2009. After the Bali Summit, the lecturer went on, countries of the world split into two groups: the industrial countries and the developing countries. The first group set out to destroy the Kyoto Protocol and replace it with a new agreement with compulsory and unified obligations on all countries in the world, industrial and developing alike, which was a breach of the principle of joint but varied responsibility. The argument put forward by the industrial countries was that some developing countries like China, India and South Africa were considered to be major polluters

of the environment. The lecturer added that refusal by the United States to sign the Kyoto Protocol led to reluctance on the part of the industrial countries to fulfil their obligations to curb their share of the emissions.

The second group, i.e., the developing countries, declared their commitment to the Kyoto Protocol, especially with regard to clean development mechanisms and the responsibility of the industrial counties for funding poor countries. The lecturer made it clear that the leading industrial countries sought to transform the Kyoto Protocol into an energy agreement in an attempt to put the principle of energy security into action. The lecturer referred to statements by the American President Barack Obama on the intention of the United States to lessen its dependence on oil, which would have an adverse effect on Arab oil-exporting countries. The Copenhagen Summit reviewed the most important new developments in climate change amid varying international standpoints. However, the lecturer went on, some basic points were agreed such as seeking to help developing countries to achieve economic diversification and technological development. He explained that there were serious doubts as to reaching a new agreement at the Mexico Summit, to be held at the end of 2010, because the differences between developed and developing countries were still huge and essential, especially with regard to the issue of reducing emissions by developed countries and the level of funding demanded by some developing countries.

The third paper, Bio-fuels and their Impact on the Environment and Development, was presented by Dr Fuad Siala, Advisor on Alternative Energy, OPEC, who began by defining bio-fuels and enumerating its types and the technologies used in each. He went on to say that the growth seen by the world in 2001-2008 and the resulting big rise in global demand for oil products, then the rise in oil prices until the middle of 2008 encouraged some investors to look at alternatives to oil such as bio-fuels. He added that energy policies in industrial countries and international efforts to face climate change played an important part in increasing interest in bio-fuels. The lecturer explained that the latest developments in bio-fuel production around the world had harmful repercussions on food security and the

environment, in addition to uncertainty as to the economic feasibility of bio-fuels. The move in some countries towards producing bio-fuels was bolstered by a surplus of investments in energy besides the upward spiral in oil prices and fears over climate change, the lecturer said. He stressed that the trend to transform food crops into industrial fuels and redistribution of agricultural land away from food production was a matter of concern and had negative and harmful effects on world economy and countries in the world, especially poor ones.

The fourth paper, Environmental Protection Measures in Petroleum Industry, was presented by Dr Mohammad Abdelwahab Ramadhan, Deputy Managing Director for Health, Safety and the Environment, Kuwait Petroleum Corporation. The lecturer defined pollution, moving on to environmental issues related to the oil industry and the pollution from all stages of that industry, the measures taken by it to cut pollution in all its stages and the additional possibilities of reducing pollution. The lecturer reviewed leading projects undertaken by the Kuwait Petroleum Corporation and its subsidiaries to protect the environment from pollution. Finally, the lecturer said that technology had an important vital role in reducing the impact of industrial processes on the environment and climate.

Fourth Technical Session

The fourth technical session was held on 11 May 2010 and chaired by H.E. Shukri Ghanem, Secretary of the Management Committee, National Oil Corporation, Libya. The topic was The Role of Regional Markets and Energy Institutions in World Market Stability. Four papers were presented at the session.

The first paper, Supply and Demand for Oil and Natural Gas In China and India: Past and Future Outlook, was presented by Mrs Deepti Mahajan, Research Fellow, Energy and Resources Institute, India. Mrs Mahajan began by saying that the rapid economic growth seen by China and India resulted in such increase in their energy consumption that the two countries became major players in global energy markets. According to estimates by the International Energy Agency in 2007, China and India

would together account for no less than 45% of the rise in global demand for energy in 2030. Aware of their increasing requirements of energy, China and India were drawing up contingency plans to guide their energy policies, especially because their local oil and gas production met only a small part of their demand, which meant that they imported most of their requirements from countries in the Middle East and were expected to do so in the future. The lecturer went on to throw light on expected energy trends in both countries and the measures and strategies they followed at the local level and through partnerships with the outside world, especially Arab countries. She also gave her expectation as to the tendencies in China and India to diversify their energy combinations by moving to build and develop nuclear stations and exploit new and renewable energy sources. Such a tendency, the lecturer explained, would be partly due to local environmental considerations, concern over global climate change and the wish to conform to international environmental standards, in addition to fears over the fall in oil and gas reserves. It was clear, the lecturer went on, that the two countries were devising optimistic scenarios regarding renewable and nuclear sources of energy to reduce the dominance of hydrocarbons over the energy combinations in the two countries. The lecturer went on to say that the Chinese and Indian economies were still growing rapidly, which required more oil and natural gas imports to sustain that growth rate. Overall oil consumption, which amounted to 9.3m [?] b/d in 2005, was expected to rise to 23m [?] b/d in 2030. This would represent 42% of the rise in global demand for oil during that period, according to estimates by the International Energy Agency in 2007, an issue that was central to the paper. It was to be noted, the lecturer went on, that the nature of the Chinese economy was different from that of the Indian economy. China, despite its openness, still followed a governmentally planned economic policy while India had a mixed economy combining the public and private sectors.

The second paper, Role of Oil- Exporting Countries in Market Stability, was presented by Dr Hasan Qabazard, Head of Research Department, OPEC, who began by stating that the main objective of OPEC was to arrive at ways and means of ensuring price stability in global oil markets in order to eliminate harmful and unnecessary fluctuations. The OPEC

Summit Declaration of 2007, he said, identified three basic principles for the Organization, namely, working to stabilize global energy markets; energy for sustainable development; and energy and the environment. He then discussed the importance of OPEC member countries in the global energy market due to the fact that those states had 79% of the oil reserves in the world and accounted for 45% of overall oil production. They also had 49% of the global gas reserves and accounted for 16% of global gas production. He referred to the rounds of dialogue between exporters and consumers aimed at maintaining stability in the oil market and securing supplies and demand. He then discussed the efforts by OPEC in 2008 to maintain stability in oil prices and keep them under control when they reached record levels at the beginning of that year before falling back in the middle of it. It was his view that dialogue between exporters and consumers on the basis of transparency could contribute to reinforcing confidence- building measures between the two sides and bring the viewpoints of all the parties concerned closer in order to allow for cooperation in the face of challenges to energy security. The lecturer stressed that oil would remain a major source of energy in the 21st century. He recalled that the oil market saw a recovery in 2010 as a result of positive indicators of possible improvement in economic conditions around the world.

The third paper, Energy Security and Dialogue between Exporters and Consumers, was presented by Dr Said Nachet, Director of Energy, International Energy Forum (IEF). His main point was that energy security was now considered a major international issue and cause for concern to all countries that could not be ignored by any government. The lecturer pointed out that ensuring secure and sustainable energy supplies required on-going development of the infrastructure of energy installations as well as developing new energy sources. This required more investments in the energy sector and doubling of efforts in the energy technology sector. The lecturer added that the global oil market saw sharp fluctuations in the previous five years, with oil prices reaching record levels ($150 per barrel in July 2008) before falling back to under $40 per barrel in January 2009. The oil market was greatly affected by the international financial crisis and the economic slow-sown in many leading oil- consuming countries.

The fourth paper, The Role of National and International Oil Companies in Energy Market Stability, was presented by Dr Ahmad Al-Hashimi Mazighi, Director of Planning and Studies, Sonatrach, Algeria. The lecturer began by referring to the big change in the oil map in the world where most oil reservoirs and proven reserves were under the control and management of national oil companies after decades of control by what used to be called the "Seven Big Sisters" of all cycles of the oil industry in most of the world except the Soviet Union. The lecturer added that national and international companies were currently facing a common challenge, namely, supplying the world with clean oil products conforming to environmental specifications that were becoming increasingly stringent. Another challenge raised the spectre of natural drying up of easy oil resources and having to move on to explore new and hard to reach sources and resources requiring deployment of huge financial and technological capabilities, especially in the case of offshore resources. The lecturer then discussed the relation between technology and oil market stability in some detail, saying that international models portrayed the balance between supply and demand for energy as a matter of price flexibility. But he reminded his audience that price flexibility could only explain about 50% of price movement. He stressed that processes of development and innovation were also considered to be main determinants of oil prices. He concluded by saying that the best that could be offered to explain this phenomenon was to consider the mutual relation between price movement and the development of the oil and gas industry technology.

Third Panel Discussion

The third panel discussion was held on 11 May 2010 and chaired by H.E. Shukri Ghanem, Secretary of the Management Committee, National Oil Corporation, Libya. Its topic was 'Expected Developments in Technology up to 2050 and their Probable Repercussions on the Oil and Natural Gas Sector in Arab Countries.' The discussion paper, entitled Future Developments in Technology up to 2050, was presented by Mr Bharat Srinivasan, Managing Director, Chevron Company, who threw light on prospects of technology in the oil and gas sector, which, he

said, would focus on developing the existing fields, improving reservoir management, eliminating refinery bottlenecks, reducing the cost of the exploration and prospecting processes and seeking to raise energy efficiency. The lecturer stressed that methods of improved oil recovery played a leading role in raising the recovery factor by up to 30% of the geological reserve, which exceeded what could be achieved by traditional methods. He added that cooperation between oil-exporting countries and international oil companies (IOCs) in the field of technology was expected to contribute to increasing oil reserves. The lecturer expected that oil from untraditional sources would gain in importance in the future, especially in North America. International oil companies, he explained, would in the future move towards prospecting and investing in untraditional sources, which at present accounted for about 9% of total global reserves. Global demand for energy would rise from 12.842m tons of oil equivalent in 2010 to 17.095m tons of oil equivalent in 2030, he said. The share of oil in overall global demand for energy would be 32%, while that of coal and gas would be 26% and 23% respectively.

The following panellists took part in the discussion that followed the lecture:

Mr Samir Bin Saud Al-Ashqar, Director of Advanced Research Centre, Aramco, Saudi Arabia, who presented a paper entitled Developments in Tomorrow's Technology in Exploring Oil and Natural Gas. He pointed out that the increasing rise in the global demand for energy made it more difficult and challenging to secure its sources, a fact that required more emphasis on supporting and developing technology. He added that the object of oil technology was to discover more quantities of oil and gas and maximise production. Mr Al-Ashqar reviewed some modern technologies in the oil industry such as smart fields, which would hopefully contribute to securing oil supplies.

Mr Sami Fahad Al-Rushaid, Chairman of the Board, Managing Director, Kuwait Petroleum Corporation, who presented a paper entitled Technology in 2050, in which he pointed out the difficulty of predicting future developments in energy technology. He called for increasing

investments in the oil and gas sectors, developing centres of oil research in Arab countries to maintain their competitive edge in the future when the industrial countries were moving towards developing renewable energy sources.

Dr Kamal Bin Nasser, Economic Expert, Schlumberger Company, who said that supplying fossil energy for competitive prices required more efforts to develop energy technology. He expected that oil and gas obtained from untraditional sources would have a larger share in the future. He called for more attention to technologies that contributed to environmental protection such as carbon dioxide capture and storage technology.

Dr Zara Al-Khatib, Technology Manager, New Business Development and Technical Management, Shell Upstream International, who presented a paper entitled Expected Technological Developments up to 2050 and their Probable Impact on the Oil and Natural Gas Sector in Arab Countries. In this paper, Dr Al-Khatib discussed challenges in the energy industry such as dealing with heavy oil, difficult fields and scarcity of water resources. She explained that every extracted barrel of oil was offset by three extracted barrels of highly saline un-potable water, whose level increased by 10% every year around the world. She reviewed some promising types of energy technology in the Middle East such as smart fields, technologies of improved oil recovery and other technologies for producing oil and gas from untraditional sources.

Fourth Panel Discussion

The fourth panel discussion was held on 12 May 2010 and chaired by H.E. Abdlatif Y. Al-Hamad, Director General, Chairman of the Board, Arab Fund for Economic and Social Development. (AFESD) Its topic was 'Arab Cooperation in Energy.'

Two papers were presented. The first, Arab Cooperation in the Field of Electrical Interconnection: An Analytical Look, was presented by Dr Samir Alkotob, Arab Fund for Economic and Social Development. The

second, Arab Cooperation in the Field of Oil and Gas, was presented by Dr Jamil Tahir, Director of the Economics Department, OAPEC.

In the first paper, presented on behalf of the Arab Fund for Economic and Social Development, Dr Alkotob reviewed the developments in the projects for electrical interconnection in Arab countries in the previous ten years and explained the extent of the benefit derived by each country from the projects that had been implemented, and the main obstacles in the way of optimal exploitation of electrical interconnection projects. He went on to discuss the efforts made by Arab countries to activate the completed projects such as boosting the capabilities of interconnection lines as well as those of electricity generation stations and increasing the capacity of internal transmission networks. The lecturer also dealt with some commercial aspects of the interconnection projects that should be studied such as the need for creating energy markets that included Arab and European countries. The lecturer explained that activating such a market called for overcoming some bottlenecks in Arab countries in terms of structuring primary energy and electrical energy pricing and dealing with differences in legislative and legal systems concerned with generating, transmitting and distributing electrical energy. Due to dependence of most Arab countries on natural gas for electricity generation and the existence of an oversupply of natural gas in some of these countries and shortages in others, the lecturer stressed the importance of conducting a comparative and integrated study of natural gas exploitation to generate electricity. As a result of the efforts made in previous years and the projects already implemented and those about to be implemented, it was expected that by the end of 2015, electrical interconnection of 18 Arab countries would be completed using a unified network connected to the European network by 3 or 4 lines, the lecturer said. This system would create an energy market comprising all the countries connected. The lecturer pointed out that in the previous two decades, Arab countries spent more than $2bn on projects of electrical interconnection of their networks. Of the 13 projects already completed, 12 entered service. Two other projects that were being implemented would be completed in 2011. A number of electrical interconnection projects that had entered service achieved an acceptable

level of the expected benefits. Other interconnection projects achieved only a low level of the desired benefits so far.

The lecturer said that a review of the development of the amount of energy exchanged by different Arab countries from 2011 until the end of 2009 would reveal that such amount hovered around 2300 gigawatt/hour in that period. On the other hand, a comparison of the total energy exchanged by Arab countries to that exchanged by Morocco and Spain only would reveal that energy imported by Morocco from Spain in each of the three previous years exceeded the total energy exchanged by all Arab countries in each of those years. This finding, the lecturer went on, was confirmed by the fact that in 2009 Morocco imported about 4300 gigawatt/hour from Spain while total energy exchanged by all Arab countries did not exceed around 2800 gigawatt/hour in the same year.

The lecturer went on to discuss the importance of electrical interconnection, considered to be an effective means of rationalizing electrical systems and a cornerstone of cooperation among Arab countries aimed at cutting the capital expenditure and operational cost needed to produce electricity to meet a certain level of demand and achieve savings on primary energy use. Interconnection had many other advantages that varied according to type, purpose and policies of the connected countries regarding dependence on other countries for meeting their electrical energy needs, the lecturer said. Naturally enough, electrical interconnection usually started among neighbouring countries in a modest form and for the purpose of exchange at certain times, but it soon grew into more developed forms in the light of actual experience and after the partners had started to feel secure from the technical, strategic and political point of view and certain of the benefits of interconnection. The lecturer went on to outline the general plan for connecting networks of member states of the Gulf Cooperation Council (GCC) that was being implemented in three stages. In stage 1, the Zor station in Kuwait would be connected to the Fadhili, Ghunan and Salwa stations in Saudi Arabia, the Jasra station in Bahrain and the southern Doha station in Qatar, all at a tension of 400 kilovolt. Those lines, which constituted the northern part of the network, would in Stage 2 be connected

to the UAE and Oman networks, which constituted the southern part of the network. In Stage 3, the northern part of the network would be connected to the southern part. In 2009, electricity networks in Kuwait, Saudi Arabia, Qatar and Bahrain were connected at a tension of 400 kilovolt, and it was expected to complete the process of connecting the electricity networks in these countries with the two networks in the UAE and Oman by 2011.

In his paper entitled The Role of Oil and Natural Gas in Strengthening Arab Cooperation, Dr Jamil Tahir reviewed some relevant indicators, concluding that it was important to heed the lessons learnt in previous decades, especially the basic role played by the oil and gas sector in driving the process of economic and social development in Arab countries on the one hand and strengthening cooperation among those countries in the field of energy on the other by means of joint oil and gas projects that were bilateral or multilateral, already existing or being implemented, financed through loans, investments or workers' remittances.

The lecturer pointed out that the oil and gas industry was considered an important activity that could effectively contribute to increasing cooperation among Arab countries for different reasons, notably the fact that the oil and gas industry involved a long series of stages, each of which represented an industry in its own right. This feature, the lecturer went on, afforded opportunities for cooperation, either bilateral or multilateral, and in all aspects such as exploration, production, refining, processing, transportation, distribution or marketing. The lecturer also pointed out that development of the oil and natural gas industry in Arab countries, accompanied by the expansion in the industry's infrastructure at a time of ready political will and increasing use of oil and gas locally and regionally paved the way for increasing cooperation among Arab countries, the lecturer said. Such cooperation manifested itself as follows:

- Joint Arab oil and gas projects already existing in Arab countries.
- Joint Arab projects being implemented or studied.
- Cooperation in the field of oil within the framework of OAPEC subsidiaries.

The lecturer recalled that cooperation among Arab countries resulted in the construction of the Sumed Line between the Suez Gulf and the Mediterranean for transporting crude oil from the Gulf States to consumption markets in Europe. The same applied to Arab Gas Pipeline transporting natural gas from Egypt to Jordan, Syria and Lebanon in the first stage, then to Turkey and some Southeast European countries.

In the GCC member states, the lecturer went on, the Dolphin Gas Project linking Qatar, the UAE and Oman was implemented. In North Africa, pipelines linked Algeria to both Tunisia and Morocco and extended to Europe under the sea.

In addition to transportation projects already existing or being implemented, the lecturer went on, there were other projects at the planning or study stage that aimed at realizing the potentials of cooperation among Arab countries such as the project for re-activating the oil pipeline between Iraq and Syria; linking Iraq to the Arab Gas Pipeline system; the gas pipelines linking Qatar and Bahrain, Iraq and Kuwait, Libya and Egypt, Libya and Tunisia, Tunisia and Algeria. The lecturer mentioned to other possible areas of cooperation among Arab countries in the energy field such as setting up joint Arab companies to operate in the field of natural gas and cooperate in oil and oil products trade, exploration, refining; oil products distribution, in addition to services and construction. Joint subsidiaries of OAPEC were considered among the most outstanding achievements of OAPEC and an embodiment of the clauses of the treaty that led to the creation of the Organization and aimed at 'benefiting from the joint resources and abilities of member countries to set up joint projects in different activities of the oil industry carried out by all member countries or by those who wish to do so.' Those subsidiaries, the lecturer went on, were able to achieve a lot of what the treaty envisaged because of their flexibility, effectiveness, continuity and independence in management and activities.

The lecturer concluded that there were many factors to encourage Arab countries to accelerate the pace of their cooperation in the field of oil and natural gas in the future. Chief among these was the availability in the Arab

region of large quantities of oil and natural gas at low prices, a fact that would contribute to improving the economies of joint Arab projects in this field. Interest in natural gas networks linking Arab countries was seen as a reflection of the high value of gas and the expected rise in demand for it in Arab markets, especially for electrical energy generation and because it was a relatively clean source of energy and therefore environment friendly. Considerable variations in the cost of transporting natural gas gave it a local and regional quality unlike oil, a factor that would strengthen opportunities of Arab cooperation in this field in the future. The lecturer finally pointed out that natural gas networks and integrated rather than competing electrical interconnection networks could play a role in achieving more cooperation among Arab countries in the field of energy, especially because both kinds of networks were necessary to meet the requirements of economic and social development.

The following panellists took part in the discussion:

Dr Ibrahim Haddad, Advisor to the Syrian Prime Minister, who focussed in his input on reinforcing Arab native capabilities in oil production and industries. He said that after more than 60 years of producing oil in the Arab world, Arabs were still unable to achieve full independence in accomplishing oil projects either jointly or even within individual countries. Dr Haddad called for Arab cooperation in the field of renewable sources of energy and suggested setting up a number of Arab agencies specialized in energy, including one for renewable energy sources, founding an Arab university for oil production and industries and creating an Arab research centre specializing in renewable sources of energy.

Dr Hisham Al-Khatib, Deputy Honorary Director, World Energy Council, who stressed the importance of Arab cooperation in the field of electricity. He pointed out that Arab development funds had a leading role to play in starting electrical interconnection projects among Arab countries. He referred to some challenges facing the setting up of joint Arab projects in the field of energy, including natural barriers like deserts and seas. In conclusion, he said that natural gas had a promising future in joint Arab energy projects.

Mr Khaldoun Qreishat, former Minister of Energy and Mineral Resources, Jordan, who focussed in his input on electrical interconnection projects between Jordan and other Arab countries, including that between Jordan and Egypt and the Eight-fold Interconnection Project. He suggested a comprehensive study on ways to boost and develop Arab electrical interconnection networks, which were facing economic challenges, and another study on the use of nuclear energy electricity generation sector. He finally called for an electrical energy common market and a regional agency for Arab electricity.

The Final Session

The final session of the Ninth Arab Energy Conference was held on 12 May 2010 and chaired by H.E. Abdullah bin Hamad Al-Attiyah, the Conference Chairman. At the beginning of the session, Mr Hasan Sa'ad, Ambassador of Lebanon to Qatar, extended his thanks to Mr Al-Attiyah and to OAPEC for accepting Lebanon's invitation to hold the Tenth Arab Energy Conference in Beirut in 2014. He also expressed the hope that his country would be equal to the task of enriching joint Arab action in the field of energy.

Speech by the Secretary General of OAPEC. H.E. Abbas Ali Al- Naqi, OAPEC Secretary General, gave a speech on behalf of the organizations sponsoring the Conference, in which he extended his heart-felt thanks, gratitude and appreciation to HH Sheikh Hamad Bin Khalifah Al Thani, Amir of Qatar, for his patronage of the Conference, which contributed massively to its success and helped to steer it in the right direction to achieve the results and make the recommendations hoped for. Mr Al-Naqi expressed the hope that the Conference would be a reference point and a guiding light in issues related to the energy industry in general and the oil and gas industry in particular. He also extended his thanks and appreciation to H.E. Abdullah Bin Hamad Al-Attiyah, the Conference Chairman, for opening the Conference on behalf of its patron and for his thoughtful management of its sessions. He extended special thanks to Arab ministers of oil, energy and electricity for attending the Conference

sessions despite their heavy responsibilities and urgent daily engagements in their home countries, which gave the conference a heavy scientific weight and ensured wide media coverage. He expressed the hope that their participation in the conference proceedings was another opportunity for contact, strengthening ties in the different fields related to oil and energy, and exchanging views on issues that would strengthen relations among their countries and open up new horizons for brotherly constructive cooperation leading to developing the Arab energy sectors at the bilateral and multilateral levels.

Mr Al-Naqi also thanked chairmen of sessions and panel discussions whose abilities and scientific, practical and administrative experience greatly contributed to their success and enabled participants to deal with different relevant issues. Mr Al-Naqi was followed by Mr Al-Tahir Al-Zaitoni, Economics Department, the Conference's Secretariat General, who read out the final joint communiqué of the Conference (full text attached).

Speech by the Conference Chairman : H.E. Abdullah bin Hamad Al-Attiyah, the Conference Chairman gave a final speech saying that the Conference dealt with basic topics in Arab energy-producing, energy-exporting and energy-consuming countries and witnessed serious and constructive discussions. He referred to the important recommendations in the joint communiqué centred round the basic theme of the Conference, i.e., Energy and Arab Cooperation. Mr Al-Attiyah stressed the need for a serious follow-up to implement those recommendations using realistic mechanisms. He pointed out that the Conference helped to strengthen personal contact and allowed for scientific exchange among delegates and lecturers as well as exchange of information and data to clarify current and future developments. Mr Al-Attiyah concluded his speech by praising the efforts of preparing for the conference that contributed to its success. Finally, Mr Al-Attiyah read out the telegram of thanks and appreciation to be sent on behalf of the heads of delegations to HH Sheikh Hamad Bin Khalifah Al Thani, Amir of Qatar, for his kind patronage and the hospitality received from His Highness and the government and people of Qatar.

The Final Joint Communique

The Ninth Arab Energy conference was convened in Doha, Qatar, on 25-28 Jumada Al-Oula 1431 AH, corresponding to 9-12 May 2010, with 'Energy and Arab Cooperation' as its theme. The Conference was organized by the General Secretariat of the Organization of Arab Petroleum Exporting Countries (OAPEC) in collaboration with the Arab Fund for Economic and Social Development and in coordination with the League of Arab States and the Arab Industrial Development and Mining Organization.

The Conference was held under the patronage of HH Sheikh Hamad bin Khalifah Al Thani, the Amir of Qatar. In his opening speech, Mr Abdullah bin Hamad Al-Attiyah, the Conference Chairman, welcomed the Arab ministers of oil, energy and electricity and other delegates and participants on behalf of HH the Amir and conveyed his wishes of success to them. Mr Al-Attiyah said that Qatar, which hosted the Second Arab Energy Conference in 1982, was happy to host the Ninth conference in 2010. He stressed the need for Arab countries to take a more active interest in cooperation among themselves in all fields, primarily in energy. He expressed the wish that sought-for Arab cooperation would strengthen and become more robust for the good of all Arab countries. He then noted Qatar's role in supplying global markets with crude oil and natural gas, having become the biggest producer of liquefied natural gas in the world, and the pioneer of gas liquefaction technology and that of transforming gas into final oil products in the Arab region. He concluded his opening speech by wishing the Conference every success and that it would come up with recommendations that could be implemented to promote Arab cooperation in energy.

Next, H.E. Abdlatif Y. Al-Hamad, Director General, Chairman of the Board, Arab Fund for Economic and Social Development, gave a speech on behalf of the organizations sponsoring the Conference in which he expressed deepest gratitude and appreciation to HH Amir of Qatar for his patronage of the Conference. He said that one aim of the Conference was to strengthen Arab cooperation in the field of energy and that oil would remain the foremost source of energy for many decades to come.

Mr Al-Hamad stressed that the Arab Economic, Development and Social Summit, convened in Kuwait at the beginning of 2009, represented a new stage in cooperation among Arab countries. He recalled that the Kuwait Declaration included assurances by Arab leaders attending the Summit that they would join efforts to develop the sectors of production, trade, services and support infrastructure, social, and environmental protection projects, in addition to electrical and gas interconnection projects. They also pledged support for plans aimed at linking Arab countries by land and for water and food security programmes aimed at realizing Arab economic integration. Mr Al-Hamad pointed out that social development in all its aspects, primarily in education and human resources development, was considered a basic factor in realizing the objectives of comprehensive sustainable development.

Apart from Arab ministers of oil, energy and electricity, who headed delegations representing 15 countries, the Conference was attended by a number of senior officials in Arab, regional and international institutions. In their opening speeches, Arab ministers and heads of delegations reviewed present conditions, future prospects of the energy sector and plans for developing this sector in their countries. Some energy experts and representatives of Arab and foreign companies and oil research centres also attended the Conference.

In the technical sessions, panel discussions and papers presented to the Conference, participants discussed general developments in energy markets, funding of energy projects, environmental aspects of such projects and Arab cooperation in the field of energy. They also discussed the developments on record in the field of oil and natural gas reserves and the transformations taking place in all stages of the oil and gas industries. Issues related to energy consumption were studied, together with institutional developments in markets that coincided with the international financial crisis still casting its shadow and impacting global economy in general as well as the oil industry, which was still beset by price instability.

Delegates to the Conference were updated on energy requirements in

Arab countries at present and in the future and the available capabilities of Arab countries with a view to formulating harmonious Arab visions regarding energy issues, working towards activating them and finding a suitable ground for coordination among Arab countries in order to drive the process of economic and social development forward and focus on the vital role of the energy sector in strengthening Arab relations on the one hand and those between Arab countries and the rest of the world on the other.

Based on the papers and discussions, the conference arrived at the following conclusions and made the following recommendations:

First: Energy Sources:

The Conference noted with satisfaction the emphasis placed in the papers dealing with this topic on the efforts of Arab countries to maximise their fossil energy sources, and it expressed appreciation for their unfailing work to retain their distinguished position in all cycles of the oil industry, especially with regard to preserving the stability of their reserves and seeking to increase them by intensifying exploration and prospecting activities. The Conference arrived at the following recommendations in this respect:

1. Expansion in the use of advanced technologies of improved oil recovery and other technologies that could contribute to increasing proven oil reserves.

2. Encouraging Arab countries to expand their use of natural gas as an environment friendly fuel in all fields, especially in electrical energy generation and as a feed in fertilizers and petrochemicals industries. Arab countries should also be encouraged to complete their electrical interconnection networks to support the gas trade among themselves and further their common interests.

3. Attaching more importance to shale and tar sands available in the Arab region as oil-supporting resources and following the relevant technological developments.

4. Encouraging the trend seen in Arab countries to exploit their renewable energy sources, which could help to meet part of the increasing local demand for energy.

Second: Downstream Oil Industries

The Conference was updated on the developments in downstream oil industries in Arab countries and the rest of the world, including refining, petrochemicals and gas industries and their important role in upgrading industrial standards, improving the economies of oil processing projects and coping with increasing local and global demand for cleaner oil derivatives. It made the following recommendations:

1. Stressing the need for following up projects aimed at updating existing refineries and building new ones in order to boost their capabilities to produce oil derivatives to international specifications.

2. Enabling the Arab private sector and qualified investors to play a bigger role in developing feeding and downstream oil industries.

3. Working to encourage integration between oil refining and petrochemicals industries, in addition to reinforcing cooperation and coordination among Arab oil refineries to safeguard their interests and improve their competitiveness in global markets.

Third: Energy Consumption Rationalization:

The delegates were updated on the recent noticeable rise in energy consumption in Arab countries in recent years and made the following recommendations:

1. Giving more support to activities raising awareness, increasing knowledge of consumption rationalization and increasing energy use efficiency at all levels and in all fields. In this respect, more importance should be attached in Arab countries to programmes of managing electrical loads, energy use rationalization and reducing electric losses because of the big impact of such measures on

reducing quantities of fuel used on the one hand and cutting emissions harmful to the environment on the other. It was also recommended to use other energy sources whenever technically, economically and environmentally possible.

2. Work to update technologies used in production processes in energy production and consumption sectors, moving to a more sustainable consumption pattern and encouraging industrial sectors to adopt modern technological methods.

Fourth: Research and Development in the Energy Sector:

Papers presented to the Conference stressed the increasing importance of research and development in the energy industry, and the Conference made the following recommendations in this respect:

1. Work to set up strong and effective networks linking national scientific research centres, especially those concerned with oil in particular and energy in general, to data banks kept by the agencies concerned.

2. Encouraging and directing scientific research and technological development towards more specialized fields in such a way as to help develop oil industries and invent local technologies, in addition to transferring and indigenising advanced technologies in the oil industry and in the field of renewable sources of energy.

Fifth: Investment in the Energy Sector:

Different energy projects in Arab countries require big investments to meet increasing local and global demand for all forms of energy. This should be done as part of the efforts by Arab countries to maintain stability in global oil markets. The Conference made the following recommendations in this respect:

1. Calling on Arab countries to make liquid assets available with a

view to bolstering Arab financial institutions and enabling them to finance and support institutions concerned with energy industry development.

2. Excluding energy projects from options of cancellation and postponement when drawing up investments strategies in Arab countries, but in a manner consistent with the laws and systems of those countries. More dependence is urged on local resources in financing energy projects and devising long-term tools for financing these projects.

3. Continuing to update laws and legislations that regulate investments and removing obstacles hindering investment in energy projects. This should be done by means of creating a better investment climate and improving transparency and god governance to ensure more market liberalization and encourage a competitive environment that can attract investments from local, Arab and international private sectors.

4. Taking a long-term view of investment in the energy sector and bypassing temporary and short-term market fluctuations by adopting strategic plans setting out priorities in this sector.

Sixth: Arab Cooperation in Energy:

The energy industry is considered to be one of the most important activities that can help to support and increase cooperation among Arab countries, so the Conference made the following recommendations:

1. Working towards activating, invigorating and expanding Arab cooperation in industries related to oil and gas after conducting economic and technical feasibility studies; supporting gas pipelines projects linking Arab gas-producing countries and Arab gas-consuming countries.

2. Completing regional electrical interconnection projects and activating

joint interconnection projects with neighbouring countries.

3. Applying market economy policies in selling and purchasing electricity and natural gas to allow for a real evaluation of the economic feasibility of projects.

Seventh: Energy, the Environment and Sustainable Development

The Conference followed up with interest the efforts made by Arab countries to protect the environment and fight pollution, and it made the following recommendations:

1. Studying the causes and effects of climate change in more depth and keeping up the work to find practical solutions for environmental protection as a matter of joint international duty and responsibility.

2. Calling on Arab countries to encourage scientific research and apply advanced technologies in the field of oil and gas, especially carbon dioxide capture and storage technology.

3. Confirming commitment to the Rio de Janeiro Declaration on the Environment and Development, especially the principle of joint, but varied responsibilities between advanced and developing countries. The Conference also called on Arab countries to activate their participation in agreements related to the climate and to pay attention to the information aspect of protecting the environment.

Eighth: Dialogue between Producers and Consumers

The Conference expressed satisfaction with the progress made in the dialogue between oil-producing and oil-consuming countries, and it made the following recommendations:

- Continued encouragement and support for dialogue and cooperation between producing and consuming countries and all the main parties directly concerned with the oil industry.

- Stressing the importance of transparency in energy data and in the

policies of the consuming countries for determining general trend in the demand for oil.

- Working to ensure market stability by means of cooperation in cases of sudden shortage of supplies due to emergencies and by tightening money market regulations

Ninth: Date and Venue of the Next Conference:

On behalf of the organizations sponsoring the Conference, H.E. Abbas Ali Al-Naqi, OAPEC Secretary General, gave a speech expressing thanks and appreciation to all those who contributed to the success of the Conference. Lebanon's offer to host the Tenth Arab Energy Conference in 2014 was welcomed and accepted.

Delegates expressed their appreciation and gratitude to the Qatari government and people for their hospitality, kind reception and care, and especially for the cooperation of the Ministry of Energy and Industry in facilitating the Conference proceedings. In response to the request by the ministers and heads of delegations, Mr Abdullah bin Hamad Al-Attiyah, the Conference Chairman, sent a telegram of thanks and appreciation to HH the Amir of Qatar for his patronage of the Conference. The Conference also extended thanks and appreciation to the Conference Chairman for his help to the organizations sponsoring the Conference in their task of preparing for it and for his distinguished chairmanship.

Doha, 27 Jumada Al-Oula 1431 AH., corresponding to 12 May 2010.

II. ARAB AND INTERNATIONAL COOPERATION

2. Seminars and Meetings Organized by the General Secretariat

2-1 10th Meeting of Working Group on Potential Cooperation in Natural Gas Investment, 6-7 October 2010, Cairo, Egypt

The 10th meeting of the Working Group was held in Cairo between 6-7 October 2010. The meeting was inaugurated by H.E. Abbas Ali Al-Naqi, OAPEC Secretary General, who welcomed the participants and noted the importance of the meeting and its timing as it comes with signs of gradual global economic situation improvement, nevertheless it is hard to predict if the global economy will return to its former growth rates. The meeting was attended by 28 experts from OAPEC member countries except for Iraq. The participants presented working papers on developments in the natural gas industry in every country that covered the period between the 9th and the 10th meetings.

Participants emphasized their satisfaction with the achievements in the field of bilateral or multilateral cooperation which reflects the inter-Arab cooperation in this field; they expressed the hope to expand the cooperation in order to achieve the desired integration. Participants also expressed admiration to the efforts of the General Secretariat in such meetings, which are considered as a distinct area for the exchange of information and experiences, they recommended that General Secretariat continues to hold this meeting, and follows-up the recommendations resulted.

2-2 6th Coordination Meeting for Managers of Arab Petroleum Training Institutes in OAPEC Member Countries

In response to an invitation from OAPEC's General Secretariat, and based on an invitation from the ministry of oil in the State of Kuwait, the 6th Coordination Meeting for Managers of Petroleum Training Institutes was held in Kuwait, 17-18 October 2010.

The meeting was attended by 25 specialists from the training institutes from all OAPEC's countries (except for the United Arab Emirates), with participants form the Arab Petroleum Training Institute and the General Secretariat.

The meeting was opened by H.E. Abbas Ali Al- Naqi, OAPEC Secretary General, who welcomed the participants and thanked the State of Kuwait for hosting the meeting. He also emphasized the importance of these meetings to identify the possibilities and capabilities of the member countries in various fields of training and exchanging of experiences in this vital area, which represents the cornerstone of the oil and gas industry. He assured the importance of working to achieve integration among the countries to reach the greatest possible utilization of the available capabilities.

In his speech, H.E. the head of the delegation of the State of Kuwait, wished the meeting all the success in its deliberations, pointing to the importance of the subjects covered by the meeting, and the need to come up with results that may contribute to the development of the petroleum industry in the member countries.

Officials of the training institutes of the member countries and the Arab Training Institute reviewed the current situations and training programs in their countries, and the aspiration of these institutes to cooperate with its counterparts, and assured the importance of the continuous exchange of trainers and trainees between all the oil training institutes of the member countries based on bilateral agreements or others. They assured the importance of uploading the addresses of the Arab Training Institutes on the website of the Organization of Arab Petroleum Exporting Countries (OAPEC).

It must be stressed that none of the delegations has had a suggestion to host the next meeting. Participants have so agreed to provide the General Secretariat with such regard later.

2-3 Conference on (Upgrading the Oil Refineries to Produce Clean Fuel)

Based on the Secretariat›s plan for the year 2010, and in response to an invitation of H.E. Dr. Abdul Hussain bin Ali Mirza, Minister of Oil and Gas Affairs and Chairman of the National Oil and Gas Authority in the Kingdom of Bahrain, and under his patronage, the Secretariat

General of the Organization of Arab Petroleum Exporting Countries (OAPEC) in cooperation and coordination with the National Oil and Gas Authority in the Kingdom of Bahrain, held a conference on (Improving the Oil Refineries to Produce Cleaner Fuels). The conference was held in Manama, Kingdom of Bahrain during the period 25-27 October 2010, and was intended to shed light on ways to develop the petroleum refining industry for the production of oil products that are compatible with the requirements of legislation for the protection of the environment from pollution, along with the exchange of experiences in the application of modern and developed production techniques. More than 100 Participated attended the conference, 85 of them were of the member countries, and a number of specialists in the industry of oil refining companies of the member countries of the Organization of Arab Petroleum Exporting Countries (OAPEC), in addition to representatives from companies and regional and international research institutes including Kuwait Institute for Scientific Research (KISR), the Japan Center for Cooperation of Petroleum (JCCP), French Axens company and Hart Energy Inc., in addition to the participants from the General Secretariat.

Five technical sessions were held in the two days- conference, they covered the following key issues:

1. Global refining outlook, challenges and opportunities.
2. Developments of specifications and characteristics of petroleum products.
3. Strategies for the production of cleaner fuels, technical and economic solutions.
4. Experiences of Arab countries in the development of refineries to produce cleaner fuels, and lessons learned.
5. The impact the production of clean fuel legislations on the oil refining industry.
6. Integration between of the refineries and the petrochemical industry, and their impact on the production of clean fuels.
7. The environmental impact of the oil refining industry and possible solutions.

The 3rd day also included a field trip to Bahrain oil refinery, in addition to visiting the petroleum museum (Dar Al Naft).

2-4 The 17th Coordination Meeting of Environment and Climate Change Experts in Member Countries

Based on the Secretariat›s plan for the year 2010, the 17th Coordination Meeting of the Environment and Climate Change Experts in Member Countries was held in Cairo, 7-8 November 2010.

The meeting was attended by specialists from all member countries distributed as follows: the United Arab Emirates (1), Bahrain (3), Algeria (1), Saudi Arabia (3), Syrian Arab Republic (2), the Republic of Iraq (1), Qatar (1), Kuwait (2), the Libyan Arab Jamahiriya (1), Arab Republic of Egypt (4), League of Arab States - the technical secretariat of the council of Arab ministers responsible for the environment- (1), General Secretariat of the Cooperation Council for the Arab States of the Gulf (1), in addition to the delegation of the General Secretariat (1).

The meeting was inaugurated by OAPEC Secretary General H.E. Mr. Abbas Ali Al-Naqi, who welcomed the participants and pointed out that the Secretariat has held these meetings ahead of the annual Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC), which will be held this year in Cancun, Mexico, 29 November-10 December 2010. He also noted that the current meeting aims to discuss issues that require coordination among the member countries in order to enable them to protect their various interests.

He added that the meeting would focus on following- up the latest developments under UNFCCC and the Kyoto Protocol, as well as coordinating the positions at international and regional meetings, especially the Conference of the Parties at its (COP 16) session, the Conference of the Parties Serving as the Meeting of the Parties to the Kyoto Protocol at its (CMP- 6)session, the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA) and the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP).

Mr. Aisar Tayeb of Saudi Arabia delegation was elected to head the meeting. Dr Samir Mahmoud El Kareish -Director of Technical Affairs at the General Secretariat- then reviewed developments relating to the Convention since the COP-15 meetings in Copenhagen, Denmark from 7 to 18 December 2009, as well as the initial program for the forthcoming meetings to be held in Cancun, Mexico.

The participants discussed the developments related to UNFCCC and the Kyoto Protocol and the preparations for the forthcoming meetings in Cancun, Mexico (29 November- 10 December 2010), several recommendations on the coordinating positions at those meetings were adopted.

2-5- A Study on the Developments of Oil and Natural Gas Supply in Russia and its Impacts on the Member Countries.

Russia is the largest country in the world in terms of geographical area, it is rich in natural sources, where it holds the largest reserves of gas and the second largest reserves of coal and the seventh largest oil reserves in the world.

The first part of the study was dedicated to give an overview of the energy sector in Russia, where hydrocarbon resources (oil, gas and coal) form approximately 90% of the total consumption of primary energy.

The second part dealt with the evolution of production and consumption of oil in Russia. The Russian production began to increase since the end of the nineties of the past decade and continued growing to reach 9.978 million b/d in 2008. As for oil consumption, it has been marked by fluctuating rates throughout the last ten years.

The third part touched on the development of production and consumption of natural gas in Russia, where Russia is the biggest producer of the gas in the world with approximately 20% of the world total production. As for consumption, gas consumption in Russia increased during the period 1999-2008 to reach about 420 billion cubic meters in 2008.

The forth part of the study addressed the issue of export and markets for oil and natural gas, where Russia produces more than it consumes from both oil and gas, allowing availability of quantities for export. As for natural gas, although the increased consumption is about equal to the increase in gas production in recent years, however, that the export of natural gas reached 247.3 billion cubic meters in 2008 compared with 215 billion cubic meters in 2005.

The fifth part of the study dealt with the prospects for exports of oil and natural gas in Russia and their impact on member countries, where predictions of the different sources indicate that Russia will remain a major exporter of oil and gas, with a variation in the estimation of quantities available for export in the long run. Despite the enormous reserves of oil and gas, there are many uncertainties surrounding the future of Russian oil and gas exports in the long run in particular.

In the gas sector, the countries of the European Union, under the framework of reviewing their policy towards the diversification of sources of energy supply and reducing dependency on Russian gas, strives for additional gas supply from the member countries, especially though pipelines from Egypt and Iraq, giving gas exports from the member countries a significant competitive position in the market in question.

2-6 A Study Entitled: Future Demand for Energy in Developing Countries and its Impact on Arab Oil Countries

Developing countries occupy an important place in the field of energy, accounting for more than 80% of global oil reserves, their shares of total world reserves of natural gas have significantly increased to reach 60.6% in 2008. As for coal reserves, these are mostly concentrated in eight countries, namely: the United States of America, Russia, China, Australia, India, South Africa, Ukraine and Kazakhstan, these countries together possess 90% of the total world reserves.

The study firstly addressed the basic indicators of energy in terms of reserves, production and consumption by economic and geographic groups, and then according to various sources of energy during the period 1990-2008.

Secondly, the study touched on the major predictions of different world resources of energy production and consumption especially in the developing countries until 2030. It also reviewed the expectations of final energy consumption by the major economic sectors, namely: the industrial, transportation, residential and the commercial sectors.

The study was divided into eight sections, the first section dealt with the world's energy reserves for the period 1990-2008, while production and consumption of energy in the world during this period were discussed in section two and section three. The fourth section reviewed the global oil trade, and sections five and six out looked for energy demand and final consumption of world energy until 2030.

Section seven has addressed global investments required in the energy sector in 2030, and the eighth section was devoted to address the implications of energy demand in developing countries for the oil sector in Arab countries.

2-7 A Study Entitled: The Development of Transportation Fuels Alternatives Production and the Implications for Member Countries

The study aims to shed light on the development of transportation fuel alternatives production and the implications for the member countries.

The first part of the study gave an overview of the importance of the transportation sector in the global oil market, where that's sector is a key market for oil, it dominates more than 61% of the total demand for oil.

The second part discussed the development of the transportation sector and its prospects, as rapid growth and enormous development in the mass transportation of various types is the most prominent feature of the twentieth century. The third part of the study touched on the search for transportation fuel alternatives. After the successes achieved in the replacement of oil by other sources in electricity generation, industrial countries have been focusing the search for alternatives to transportation fuel for many reasons, notably, high oil prices and growing demand for transportation as well as global concerns about energy security and environmental considerations

The forth Part of the study was devoted to address the types of alternatives to transportation fuels and its evolution. Part five of the study was devoted to shed light on the prospects for transportation fuels alternative and the implications for member countries.

2-8 A Study Entitled: Reality and Prospects for the Oil Balance in China and the Implications for Member Countries

The study aims to review the current situation and future of the balance of oil in China, and to state the special place enjoyed by the member countries of OAPEC in the world oil market at present and in the long term, and what can those countries do towards meeting the needs of China's growing demand for oil. The study was divided into three main parts, the first part reviewed the current status and future of the oil sector in China, to clarify the pivotal role China will play with respect to the expected increases in global demand for oil. It demand is expected to grow by 3.1% during the period 2007 to 2030 to reach nearly 16 million b/d in 2030 compared with 8.2 million b/d in 2009, In contrast, its oil production is decreasing, which means more reliance on oil imports to meet those needs.

In the second part the study addressed the importance role of the member countries in OAPEC in the world oil market, what confirmed that prestigious indicators is related to proven oil reserves, which accounted for 56.6 %of the total world reserves, and 28.5 % of the current world oil production, a share is expected to reach 38% by 2030.

The third part was devoted to address the implications of the development in the oil balance in China's oil demand for the trade of member countries on the one hand, and the size of their investments in the oil sector on the other hand. It obviously seemed that China will find itself in the light of low domestic production, and will suffer from a significant deficit in meeting its demand for oil.

2-9 A Study Entitled: Following up the Implications of the Global Financial Crisis on the Oil Sector in the Arab Countries and the Arab Economy

The study aims to follow up the real implications of the financial crisis on world oil markets, focusing primarily on the implications for the Arab oil

sector and the Arab economy, after more than two years of the outbreak of the crisis, which replaced the expectations with real terms, and ended with the return of cautious optimism to the prospects for the global economy in 2010. The first part of the study reviewed the crisis and the facts that formed the major reasons behind it, and the stages of its evolution since it broke out. The second part discussed the repercussions of the financial crisis and its impact on the global economy after more than two years of its inception. The third part of the study addressed the consequences of the financial crisis on global oil markets, while the forth part dealt with the implications of the crisis on the Arab economy.

2-10 A Study entitled: The Role of Oil Inventories in the World Markets and the Implications for Member Countries.

The study aims to review the impact of developments in oil inventories on the supply of oil from producing countries in general and the member countries in particular, and its impact on the fluctuations in the prices of different oils during the period 1999-2010.

The first part of the study reviewed types and categories of inventories of various types of oil adopted by the oil industry. The second part discussed the levels of oil inventories held by many of the consuming countries for some commercial and other strategic purposes. The third part of the study indicated the statistical relationship between the commercial oil inventories of the Organization of Economic Cooperation and Development (OECD), both in absolute values or the number of days of consumption adequacy on the one hand, and the prices of crude oil on the other hand. The fourth part reviewed the developments witnessed by the levels of both supply and demand for oil in order to track the balance between them, and to find out the periods which witnessed a surplus in oil supply and periods of supply deficit. In the fifth and final part, the effect of change in commercial oil inventories and its indicators in the oil market in general and on oil supplies from member countries and its oil prices in particular were discussed.

3. Conferences, Seminars, and Meetings Attended by General Secretariat

3.1 The 11th Kuwait-Japan Joint Symposium

In response to an invitation from the Kuwait Institute for Scientific Research KISR, the General Secretariat participated in the 11th Kuwait-Japan Joint Symposium on "Corrosion and Materials Degradation in the Petroleum Refining Industry" which was held in the Petroleum Researches and Studies Center between 19-20 January 2010. The symposium was sponsored by Kuwait Institute for Scientific Research KISR, Kuwait National Petroleum Company (KNPC), the Japan Petroleum Institute (JPI) and Japan Cooperation Center- Petroleum (JCCP).

- Seventeen papers were presented in the symposium; they covered the following key issues:
- The causes of the erosion phenomenon in different parts of the refineries, and its impacts on the profitability of the refinery and on the safety of the equipments.
- Refineries experiments in addressing corrosion of metals, the most important possible solutions to mitigate the effects of this phenomenon and precaution measures to prevent it from escalating.

3.2 Jeddah 10th Economic Forum

In response to an invitation from Jeddah Chamber of Commerce and Industry, the Secretary General represented the General Secretariat in Jeddah 10th Economic Forum, which was held under the title" Global Economy, 2010". The forum was held in Jeddah, Saudi Arabia between 13-16 February 2010, under the support and patronage of His Royal Highness Prince Khalid Al Faisal, Emir of Makkah Region.

Prominent Arab and international individuals participated in the activities and sessions of the forum, along with a group of experts and specialists in economic, political and environmental affairs, as well as businessmen and academics from the Arabian Gulf and the rest of the world. The forum aims

to set a vision and perception of the global economy at some point after the current global financial crisis, by locating centers and incentives for future economic growth, and anticipating future challenges and potential shifts in the balance of power, thereby enhancing the ability of decision makers to seize the opportunities and minimizing potential risks.

- The forum discussed many issues such as:
- Energy and environment.
- Global economy after the crisis.
- The future of the reserve currencies.
- Banks and money: restoring confidence in financial institutions.
- Dealing with protectionism in trade and investment.
- Agriculture and food security.
- Health.
- Science and technology.
- Education.

Speaking at the session of energy and environment- as well as other specialist- the Secretary General of the organization, pointed out the importance of taking into account the expected global situation of power in the future when it comes to the issues of energy and environment, and to the place of the GCC countries and their ability to cope with the increase in global demand for oil and gas. H.E. mentioned the topic of climate change and the expected impact of the implementation of the Framework Convention and the Kyoto Protocol to the oil industry in the countries which economies depend mainly on oil industry, and the actions taken by these countries to mitigate the potential negative effects of this phenomenon, including a focus on the production of clean fuels as well as the tendency of some member countries to invest in solar energy as one of the most important renewable energy sources available in the region.

The forum reached some conclusions, including:

- The economy that is based on "capitals" could lose part of its importance, while the industrial economy (based on the industry) could regain some of the lost position.
- State investments are directed towards future infrastructure and basic social services, especially education.
- Continued growth in the developing countries could lead to an increase in the volume of trade exchange between them, in addition to maintaining the highest rates of domestic consumption. In contrast, growth rates could fall in industrialized countries due to the need to restructuring. The problem of private and public debt t is likely to be addressed the very slowly amid growing concern about high rates of inflation that would result from significant cash injections.
- All expectations show that oil exporters of Arab gulf countries will continue to be the largest providers of world supplies of fossil fuels even in the light of the pursuit of industrial countries to promote the responsible consumption of energy and investment in renewable energy resources, while industrialized nations seek policies that rely on diversifying energy resources and reducing addiction to oil and gas, such policies count on attempts to reduce dependency on oil from the region, in contrast, GCC countries work on exploiting and utilizing other energy resources, such as solar and nuclear energy.

3.3 SPE North Africa Technical Conference and Exhibition

In response to an invitation of the petroleum ministry of the Arab Republic of Egypt, the General Secretariat participated in the SPE North Africa Technical Conference and Exhibition (Society of Petroleum Engineers), which was held in Cairo between 14-17 February 2010.

The main aim of the conference was to publish and exchange the technical knowledge and expertise concerned with all aspects of oil and gas industry. Twenty four technical sessions were held, those have covered all the

sectors of oil and gas industry, including: reservoir management, handling formation and produced waters, reserves evaluation, challenges of deep drilling, improved oil recovery, competency management, exploration, enhancing and boosting production and some other important issues. The conference provided four discussion panels, and an exhibition included a number of companies that provided an overview of its activities and products to the attendants, in addition to posters presentation showed the results some companies have reached through the application of modern techniques in several aspects, this in turn contributed to enrich this event. The conference was held under the patronage of the Egyptian Ministry of Petroleum, with support of the Egyptian General Authority for Mineral Resources, the Society of Petroleum of Egypt, and the Egyptian General Petroleum Corporation, and of the following companies: CHEM, EGAS, GANOPE, along with some other international oil companies.

3.4 The 3rd Meeting about Regional Cooperation for Clean Utilization of Oil Shale

In response to an invitation from the team leader of the Euro-Mediterranean Energy Market Integration Project, the General Secretariat participated in the third meeting about regional cooperation for clean utilization of oil shale, which was held in Sharm El Sheikh, Egypt, between 24- 25 February 2010.

The meeting comes in the framework of the Euro- Med dialogue, based on the countries of the region that have reserves of shale oil, those namely are: Morocco, Jordan, Egypt, Syria and Turkey, with the aim of cooperation and exchanging the information to utilize these reserves and engage them in the production of electricity and fuels and some other products. The meeting also discussed a project of creating an international or regional council for oil shale.

The meeting was attended by delegations representing the five countries mentioned above, in addition to representatives from operating companies and private sector companies interested in investing in oil shale sector, such as INOCIN, Saudi International Corporation for Oil Shale Investment,

Dana Gas of UAE, Exxon Mobil, Energy and Mines Jordan Co. Ltd. and Enefit Estonian German Inc., as well as representatives of the European Commission in the Arab Republic of Egypt, and the Secretariat of the Organization of Arab Petroleum Exporting Countries, and the Secretariat of the League of Arab States.

Speaking at the opening session, the Secretary General of OAPEC mentioned the role expected from unconventional oil - as well as other resources- in meeting the global demand for oil, a role that is relatively limited. H.E. also indicated the abundance of oil shale resources in the world, especially in the United States of America, and that Shale oil reserves available substantially in Morocco and Jordan, and less so in Egypt and Syria. He pointed out that investments in these resources face technical, economic and environmental challenges; he assured the importance of mutual cooperation between the countries of the region, and the significance of exchanging information and expertise to overcome the challenges.

H.E. also referred to the importance of utilizing these resources especially in Morocco and Jordan who rely on imported energy. Utilizing these resources in Egypt and Syria will also add to the oil reserves, and help increasing oil exports. He showed that countries and investors are interested in utilizing those resources especially in the case of high oil prices, such interest fades out with low oil prices.

Country papers about the development witnessed in the concerned countries in the field of evaluating the resources and the attempts to encourage specialized companies to invest in this sector were presented to the conference.

Attendants form the concerned countries discussed the outlines to create an International Oil Shale Council- IOSC, and the main points of the bylaw. It was agreed to present this project to the concerned countries, namely, Morocco, Jordan, Egypt, Syria, and Turkey, and to European Union as the sponsor of the project.

3.5 The 1st Arab Conference on the Prospects of Nuclear Power for Electricity Generation and Seawater Desalination

In response to an invitation from the League of Arab States and the Arab Atomic Energy Agency, General Secretariat participated in "the First Arab Conference on the Prospects of Nuclear Power for Electricity Generation and Seawater Desalination", which was held in Hammamet city of Tunisia, between 23- 25 June 2010. The conference was organized by the Arab Atomic Energy Agency in cooperation with the General Secretariat of the League of Arab States (Directorate of Energy) and the International Atomic Energy Agency, with support of Tunisian Company for Electricity and Gas.

The conference included seven sessions over the three days during which forty one presentations and intervention were delivered within the following five main themes:

- Arabic programs for nuclear power.
- Arab cooperation in building power plants.
- International nuclear power plant technologies.
- Topics to establish nuclear power programs.
- Safety, security and safeguard of nuclear material.

3.6 The 2nd Japan-Arab Economic Forum

In response to an invitation from the League of Arab States, and another invitation from the Japanese government, the General Secretariat participated in "the Second Japan-Arab Economic Forum" held in Tunisia between 11- 12 December 2010.

The forum aims to provide a platform for cabinet ministers and business leaders of both sides, so that they can discuss tangible strategies for enhancing their economic ties in a wide range of areas including trade, investment, energy, science and technology, human resource development and tourism and transportation.

The forum was inaugurated by H.E. Amro Moussa, Secretary General of the League of Arab States, and H.E. Mr. Seiji Maehara, Japanese Foreign Minister. Arab and Japanese ministers and representatives of the public and private sectors were among the 600 participants.

At the conclusion of the first day, a joint statement was issued under the name "Tunisia Declaration" in which both sides recognized that it is necessary to further deepen understanding and exchange to fully make use of potentials for developing the mutually- beneficial and diverse economic relations. Both sides reconfirmed the importance of cooperation in the fields of water, oil, natural gas and renewable energy. Both sides have also assured that the forum is a mutual framework to link the trade activities of both Japan and Arab countries.

On the sidelines of the forum, memoranda of understanding and cooperation between a number of countries and bodies of Arab and Japan were signed, including a letter of intent (LOI) for cooperation in the downstream industry between OAPEC and the Japan Cooperation Center for Petroleum through joint organization of seminars, conferences and workshops, researches and studies and training. Both parties have agreed to sign a memorandum of understanding to clarify the ways and mechanisms for cooperation in those areas.

2-7 The 31st Arab Electricity Experts Meeting, and the 25th Meeting of the Executive Bureau of the Ministers Responsible for Electricity.

General Secretariat attended the 31st meetings of experts, members of the executive bureau and the council of Arab ministers responsible for electricity, which was held at the headquarters of the League of Arab States in 11-12 January 2010. General Secretariat also attended the 25th meeting of executive bureau of Arab electricity ministers which was held in the headquarters of the League of Arab States in 13 January 2010.

Participants in the experts- meeting represented the Arab countries that are members of the executive bureau, namely: Libya, Algeria, Saudi Arabia, Iraq, Syria, Qatar, Egypt and Tunisia. The meeting was also attended

by Arab Organization for Industrial Development and Mining - Arab Organization for Atomic Energy - the Arab Union of the Electricity (Arab Union Of Producers, Transporters and Distributors of Electricity) - General Secretariat of the eight electricity linkage project - GCC Interconnection Authority - The United Nations Economic and Social Commission for Western Asia (ESCWA).

The meetings addressed a number of topics, including following up the resolutions of the eighth meeting of the council, Arab electricity interconnection, peaceful uses of nuclear power, supporting the industry of electrical equipments for producing, transferring and distributing electricity in the Arab countries, scientific seminars and the cooperation with countries and regional and international organizations and blocs.

3-8 The Arab-Sino Cooperation Forum in the Field of Energy

In implementation of a Concluding Statement of the first Arab-Sino Cooperation Forum in the field of Energy, and in accordance with what has been agreed on at the sixth session of the meeting of senior officials of the Arab-Sino Cooperation Forum, the second session of the Arab-Sino Cooperation Forum in the field of energy was held in Khartoum, Sudan in 26- 28 January 2010. The session was organized by the ministry of energy and mining in Sudan, with supervision of the General Secretary of the League of the Arab States and the National Energy Authority of China.

The meeting also attended by ministries, institutions and agencies concerned with energy, the General Secretary of the League of the Arab States, the Organization of Arab Petroleum Exporting Countries (OAPEC), the Arab Atomic Energy Agency and the Arab Organization for Industrial Development and Mining.

On the Chinese side, participants represented the National Energy Authority, ministry of foreign affairs and the energy companies. 300 participants represented senior officials, experts, engineers and businessmen interested in the energy sector, 60 of the participants were from the Chinese side, the others were from the Republic of Sudan and

the other Arab countries. The Objective of the meeting was to improve and enhance the Arab- Sino cooperation in the fields related to energy including the improvement of energy efficiency, utilizing renewable energy resources and nuclear energy for peaceful purposes, as well as cooperation in exchanging expertise and technology transfer.

Participants in the second session of the forum discussed many issues including oil and natural gas, petrochemical industry, electricity, peaceful use of nuclear power and renewables.

General Secretariat presented a paper- in the first session- entitled: Arab States in the global oil market and the prospects for Arab-Sino cooperation in the field of oil and natural gas.

3-9 The 85th Meeting of the Economic and Social Council

The General Secretariat of OAPEC participated, as an observer, in the 85th meeting of the Ordinary Session of the Arab League's Economic and Social Council, held in Kuwait on 8-10 February 2010, on permanent delegates' level. Delegates representing all Arab countries except Djibouti, Republic of the Comoros and Somalia attended the meeting, as well as representatives from 19 other Arab Organizations and Institutions.

The Council's agenda comprised 13 items, among which was the main item of following-up the execution of the resolutions of the Arab Economic and Social Development summit, and the preparation for the next Arab summit.

Other items included: the Arab League Secretary General's report, profile of the economic and social Council of the League at the summit level, a draft document of the Technical Committee to facilitate transportation and trade, appointment of the commissioner of the Arab Investment Court, adopting Arab language as a business language in the World Trade Organization, Arab- International cooperation, project of the basic law of the Arab union for Nature Reserves, amendment to the bylaw of the council of Arab ministers responsible for electricity, mechanism of following up

the declaration of the world summit about food security, financing food security projects, requesting additional funding of the Arab Organization for Agricultural Development, the reports of the ministerial councils and executive bureaus and committees.

3.10 The 2nd India-Arab Investment Projects Conclave

In response to an invitation from the League of Arab States, the General Secretariat participated in The 2nd India-Arab Investment Projects Conclave held in New Delhi, India, during 8-9 February 2010.

The conference aims to encourage mutual investments between Arab and Indian sides, and promote investment in various economic sectors.

Participants included nine ministers of Arab states and four ministers of India in addition to representatives of Investment agencies and financial institutions, banking and business sector from both sides

The work of the Conference included several sessions that dealt with the following main topics:

1. Investment opportunities in the energy sector.
2. Investment opportunities in infrastructure.
3. Investment opportunities in manufacturing and small industries.
4. Opportunities for investment in social infrastructure: health and education.
5. Investment opportunities in communications and information technology.

The Secretariat presented a paper at the conference about "the prospects for Arab-Indian cooperation in energy and investment requirements".

3.11 Committee Meeting for Institutions Involved in Preparation of the Joint Arab Economic Report, 2010

The Arab institutions taking part in compiling the Joint Arab Economic Report, 2010, held a meeting in the headquarters of the Arab Monetary Fund in Abu Dhabi, UAE, from 20 to 24 June 2010. Representatives attended from the Arab League, the Arab Monetary Fund, the Arab Fund for Economic and Social Development and the Organization of Arab Petroleum Exporting Countries. The meeting dealt with several topics including statistical aspects of the report and reviewing in detail the initial drafts of the chapters that had been circulated to the participating institutions in preparation for an initial version that would be circulated on a limited basis.

The meeting discussed the subject of translation the Joint Arab Economic Report after a request from representatives of the General Secretariat to placing this issue on the agenda of the institutions involved in the preparation of the report. It was agreed that a preparatory meeting for the 2011 report would be held during 20-22 December 2010 in the Arab League headquarters in Cairo, Egypt. It was agreed also that each side should prepare outlines for its chapter so that it will be circulated between participants before the meeting.

3.12 The 86th Meeting of the Economic and Social Council

The General Secretariat took part as an observer in the meetings of the Economic and Social Council at its 86th ordinary session at the level of permanent envoys and senior officials, which was held in Cairo, Egypt, during 27- 30 September 2010. The meeting was attended by delegations from all Arab countries, and representatives from twenty Arab and regional organizations and institutions. The meeting's agenda included sixteen topics that covered the following main issues:

- Following up the activities of the Arab League, three topics fall below this issue, namely: The Arab League Secretary General's Report, follow-up the implementation of Arab Economic and Social

Development summit, and review of special accounts and funds of the specialized Arab ministerial councils.

- Economic issues, these include several items of which: the Greater Arab Free Trade zone, the developments of the Arab Customs Union (the focus of the Council), strategy of Arab tourism, forums of Arab- international cooperation, controls and criteria for the establishment of specialized new Arab organizations, in addition to the issues of regular economic issues such as: support of the Palestinian economy, Joint Arab Economic Report, and the report of the investment climate in Arab countries.

- Social issues, including three items: an integrated program to support employment and reduce unemployment in the Arab States, support the projects of the Ministry of Social Development in the State of Palestine, and amending the Statute of the Council of Arab Ministers of Health.

- The Economic and Social Council also discussed at the ministerial level the issue of convening a special session of the Council to prepare for the summit of economic and social development.

3.13 The 1st Meeting of the Committee of Experts of Electricity in the Arab States

General Secretariat participated in the first meeting of the Committee of Experts of electricity in the Arab States, held at the headquarters of the Secretariat of the League of Arab States during 20-21 October 2010.

The meeting was attended by experts from the following Arab countries: the Kingdom of Bahrain, People›s Democratic Republic of Algeria, the State of Qatar, Arab Republic of Egypt, Kingdom of Saudi Arabia, Republic of Iraq, and the Kingdom of Morocco, in addition to the Arab Organization for Industrial Development and Mining, the Arab Organization for Atomic Energy , the Arab Union for electricity, the Authority of electrical link of the Cooperation Council for the Arab States of the Gulf, ESCWA and the Organization of Arab Petroleum Exporting Countries (OAPEC).

The meeting addressed topics of the Arab power link, the peaceful uses of nuclear energy, the study of environmental considerations in the electricity sector, the cooperation with countries, organizations and regional blocs and international preparations for the second summit of the Arab Economic and Social Development.

3.14 Symposium of the Global Financial Crisis and its Impact on the Oil and Natural Gas in the Arab countries

The General Secretariat of the Organization of Arab Petroleum Exporting Countries in cooperation with the Ministry of Oil and Mineral Resources in Syrian Arab Republic, organized a symposium on global financial crisis and its impact on the oil and natural gas in Arab countries, held in Damascus during from 22 to 24 November 2010.

In his opening speech, H.E. Sufian Al Alao Minister of Oil and Mineral Resources of Syrian Arab Republic, sponsor of the symposium, mentioned the role of the Organization of Arab Petroleum Exporting Countries in promoting Arab cooperation in the field of oil and gas, stressing that Arab countries need to give more attention to cooperation with each other and with neighboring countries in various fields, including energy sector.

H.E. the Secretary General of the Organization of Arab Petroleum Exporting addressed the symposium where he stressed the keenness of the Secretariat of the Organization of Arab Petroleum Exporting Countries (OAPEC) to closely follow up the successive developments of the wolrd financial and economic crisis, and gave a brief overview of some topics of the symposium and the most important developments of the crisis.

The symposium was attended by more than eighty participants of energy experts and representatives of member countries and companies emanating from the organization, and Arab and foreign oil research centers.

The activities covered four sessions during which twenty presentations were introduced, in addition to a number of interposition that focused mainly on the review of the effects of the global financial crisis on the international oil and gas industry, with a focus on its implications for the

oil and gas industry in the Arab countries, and addressed the implications of the crisis on the global economy and its direct repercussions on the oil markets in terms of reduced demand and falling prices, declining oil revenues for the Arab exporting countries, and its role in the decline in economic growth rates in the Arab countries.

The symposium also dealt with the crisis implications for the petroleum industry in its upstream, midstream and downstream stages, the activity of national and international companies operating in the petroleum sector, the activities of the companies emanating from the Organization of Arab Petroleum Exporting Countries, along with the implications of the crisis for the investment in the energy sector in Arab countries in particular, and in the global energy sector in general.

3. 15 Preparatory Meeting on Compiling the Joint Arab Economic Report, 2011

The General Secretariat took part in a preparatory meeting on compiling the Joint Arab Economic Report, 2011, which was held at the headquarter of Arab Fund for Economic and Social Development, Kuwait, between 20- 22 December 2010.

The meeting was attended by representatives of the Arab League, the Arab Monetary Fund, the Arab Fund for Economic and Social Development, and the Organization of Arab Petroleum Exporting Countries,

The participants discussed the Joint Arab Economic Report, 2010, the preparation for the report of 2011, the statistics of 2011 report, and the development of the report.

It was agreed that the Organization of Arab Petroleum Exporting Countries would –for the first time- prepare the main chapter of 2011 report, which primary subject will address "the position of Arab countries in the world oil market, and the role of oil in the promotion of Arab economies.

III. Encouraging Scientific Research

The General Secretariat has - in early 2009- announced the subject of the OAPEC award for Scientific Research for the year 2010, which was: the results of application of new technologies in exploration and production in the Arab countries, and its economic return, the announcement was published in OAPEC's Monthly Bulletin and the Oil and Arab Cooperation Bulletin, and in some other periodicals. The announcement was placed on the OAPEC's website and was circulated to the member countries and research centers and universities. The dead line for receiving the researches was 31st of May 2010.

Pursuant to the provisions of the Award of Organization of Arab Petroleum Exporting for scientific research, the Secretary General of the Organization Mr. Abbas Ali Naqi issued the resolution No.19/2010 of 4/5/2010 to form a jury to judge the researches submitted for the OAPEC award for scientific for the year 2010, entitled " the results of application of new technologies in exploration and production in the Arab countries, and its economic return, under his chairmanship and membership of the following:

- **Dr. Mohammed Jassim Salman**, Deputy Director General for Research, Kuwait Institute for Scientific Research – Kuwait.
- **Dr. Saad Eddin Mohamed Dessouky,** head of production Petroleum Research Institute - Arab Republic of Egypt.
- **Dr. Sameer El Kareish,** Director of Technical Affairs - General Secretariat.
- **Eng. Torki Hasan Hemsh,** Petroleum Consultant/ Exploration and Production, Technical Affairs Dept. - General Secretariat.

The jury convened on 5/10/2010 in Cairo and discussed the evaluation reports submitted by the members. After exchanging of views and comments, the jury came to the following:

1. Withholding the first prize "seven thousand Kuwaiti dinars".

2. Splitting the second prize "five thousand Kuwaiti dinars" and award it in ex- aequo to two researches:

A) Research No. (6)- submitted by Dr. Eng. Khaled Ahmad Al Khalaf of the Syrian Arab Republic- entitled: "The results of applying 3D seismic survey and horizontal drilling technologies on exploration and oil production operations in Syria ", the research got 84 degrees.

B) Research No. (1) Submitted by Dr Musab Badr Eddin Al Braidy of the Syrian Arab Republic, entitled «Using the ASP chemical flooding method for increasing oil displacement factor in Dero oil field, Syria», the research got 78.5 degrees.

As for the OAPEC award for scientific research for the year 2012, the executive bureau in the 127th meeting held in Cairo on 3rd of October 2010, has decided the topic of the award to be about: Technical Development of Exploration and Exploitation of Unconventional Natural Gas Resources in Arab countries.

IV: Supporting Activities

1- Media Activities

The General Secretariat continued its media activities in the following areas:

1-1 Editing, Printing, Publishing, and Distribution

The General Secretariat continued to publish OAPEC's books and periodicals. This involved editing, proofreading, translation, designing, printing, publishing and distribution. Table (5-1) lists the books and periodicals published by the General Secretariat and the number of copies printed and distributed in 2010.

1-2 Press and Media

The General Secretariat issued several press releases on the Organization's activities, such as meetings of the Ministerial Council and Executive Bureau. Some local and Arab newspapers published articles on the Organization's activities and its role in coordinating the work of member countries and promoting joint Arab action according to Arab and international circumstances and developments. The General Secretariat also continued to monitor what local, Arab and international newspapers publish on energy affairs, and sustainably archived important news and features on oil, economics, environmental and other topics of general interest to member countries.

1.3 The 35th Arab Book Fair

The General Secretariat participated in the 35th Arab Book Fair, which was held in Kuwait, 13- 23 October 2010, and sponsored by the General Secretariat of Kuwait's National Council for Culture, Arts and Letters, State of Kuwait.

Some 510 publishing houses from 14 Arab and 12 non-Arab countries took part in the fair, in addition to number of Arab organizations based in Kuwait. They included the Arab Center for Educational Research in the Gulf States (Kuwait), the Arabization Center for Medical Science- the League of the ArabStates, the Organization of Arab Petroleum Exporting Countries, Arab Book Federation (Syria), the Secretariat General of the Gulf Cooperation Council (Saudi Arabia), and the Arab Organization for administrative development- the Arab League.

Participants to the exhibition also included a number of Arab and foreign embassies, and a number of Arab organizations and the diplomatic corps, either directly or through the proxy of some publishing houses. The exhibition was accompanied by several cultural and art events, and there was focused on the role of Arab women in the world of publishing and cultural development and creativity.

2. Administrative and Financial Activities

2-1 Evolution of the Administrative Structure

By late 2010, the number of the employees at the General Secretariat was 47, of whom 20 were professional staff and 27 were general staff. Table (5-2) shows the number of staff at the General Secretariat in the period 1968-2010.

2-2 Evolution of Actual Expenditure

The General Secretariat's actual expenditure in 2010 totaled KD 1,703,000[1] Table (5-3) shows the evolution of the General Secretariat 's actual expenditure in 1968-2010.

1 Estimated until the final accounts for 2009 are ratified at the end of May 2010.

Table 5-1
Publication Issued and Distributed by the General Secretariat in 2010

Title of Publication	No. of Editions	No. of Copies	Total Copies Printed	Copies Distributed	Total Copies Distributed
Periodicals					
- OAPEC Secretary General's Annual Report 2009 (Arabic)	1	800	800	790	790
- OAPEC Secretary General›s Annual Report 2009 (English)	1	800	800	750	750
- OAPEC Annual Statistical Report 2010	1	300	300	200	200
- OAPEC Monthly Bulletin					
Arabic / English (1 - 12)	11	1000	1100	900	9900
- Oil and Arab Cooperation : issues (132-135)	4	750	3000	550	2200
- Energy Resources Monitor - Arabic and International	4	300	1200	270	1080

Table 5 - 2
General Secretariat Employees, 1968 - 2010

Year	Professional Staff	General Staff	Total
1968	4	7	11
1969	10	14	24
1970	12	22	34
1971	10	23	33
1972	9	24	33
1973	11	23	34
1974	15	33	48
1975	31	48	79
1976	37	58	95
1977	40	70	110
1978	41	71	112
1979	45	79	124
1980	51	81	132
1981	47	87	134
1982	44	90	134
1983	51	88	139
1984	49	86	135
1985	50	82	132
1986	43	75	118
1987	24	51	75
1988	18	43	61
1989	23	39	62
1990	23	41	64
1991	22	39	61
1992	21	36	57
1993	22	33	55
1994	21	28	49
1995	21	29	50
1996	21	30	51
1997	19	32	51
1998	20	30	50
1999	17	36	53
2000	22	29	51
2001	21	31	52
2002	21	32	53
2003	22	30	52
2004	20	29	49
2005	22	29	51
2006	31	20	51
2007	22	31	53
2008	24	32	56
2009	23	32	55
2010	20	27	47

Table 5 - 3
General Secretariat Actual Expenditure by Budget Category, 1968 - 2010
(Thousand Kuwaiti dinars)

Year	Wages & Salaries	General Expenditure	Studies, Training & Information	Total
1968	9	18	-	27
1969	67	52	18	137
1970	97	75	55	227
1971	107	50	25	182
1972	126	63	17	206
1973	108	66	230	404
1974	152	140	50	342
1975	343	335	81	759
1976	525	306	434	1265
1977	694	329	367	1390
1978	807	335	467	1609
1979	929	401	432	1762
1980	1133	415	437	1985
1981	1277	461	559	2297
1982	1546	527	588	2661
1983	1763	547	634	2944
1984	1812	515	508	2835
1985	1818	447	422	2687
1986	1697	413	286	2396
1987	1439	385	190	2014
1988	799	244	122	1165
1989	733	242	145	1120
1990	771	250	141	1162
1991	693	276	87	1056
1992	734	322	114	1170
1993	765	327	118	1210
1994	718	282	127	1127
1995	709	380	140	1229
1996	725	370	140	1235
1997	725	374	148	1247
1998	735	385	140	1260
1999	712	397	127	1236
2000	799	394	138	1331
2001	886	384	141	1411
2002	885	383	146	1414
2003	874	394	154	1422
2004	762	386	147	1295
2005	928	396	148	1472
2006	837	402	206	1445
2007	1007	437	183	1627
2008	1046	482	196	1724
2009	1048	518	237	1803
2010	982	506	215	1703
Total	35,322	14,411	9,260	58,993

CHAPTER THREE

OAPEC-SPONSORED VENTURES

In 2009- 2010, OAPEC-Sponsored Ventures made every effort to take advantage of the available opportunities in order to develop and improve their performance and fulfill their assigned objectives, despite the impacts of the global financial crisis, which erupted in the fall of 2008 and the continued geopolitical tensions particularly in the Middle East and North Africa.

There were also other challenges that faced by the OAPEC's sponsored ventures due to the nature of their activities, such as competition from major international companies with similar activity, and the difficulty of entry into the Arab markets. However these challenges made OAPEC sponsored ventures more determined to confront those obstacles to achieving their goals by relying on their expertise and experience gained over the past years, and investment of such situations in order to move forward towards greater achievements.

As a result of the foregoing, it can be said that the companies sponsored by the organization are often under the influence of geopolitics in the region, so that some of them face more burden and many obstacles that impede the implementation of the plans and development and improving programs, either those which directly related to the economic situation of the country in which it the company operates, or due to the activities of similar companies, and the difficulty of enter Arab markets.

Therefore, and due to these circumstances, it has become harder for any economic entity (state or company) to deal with the consequences of ongoing global financial crisis and expected negative effects, unless it has enough experiences that will help to meet those consequences and effects.

However, and despite the difficult investment climate, and the volatility of oil price, most Arab oil exporting countries, achieved sustained

economic growth over the past years. This has been reflected positively on the OAPEC-Sponsored Ventures, as they worked hard to promote their activities and establish themselves in areas that fall within their disciplines, namely: investment in the case of the Arab Petroleum Investments Corporation APICORP; maritime oil transport in the case of the Arab Maritime Petroleum Transport Company (AMPTC); and in shipbuilding and repair as in case of the Arab Shipbuilding and Repair Yard (ASRY); and in drilling and geophysical exploration as in the case of the Arab Petroleum Services Company (APSCO) and its affiliates.

Most of the OAPEC-Sponsored Ventures were able to achieve favorable financial results during the first half of 2010. This was aided by cooperation and coordination among these ventures in the completion of projects via the provision of financial and technical support.

It should be emphasized here, that all OAPEC-Sponsored Ventures enjoy complete independence, and their general assemblies and boards of directors are responsible for making decisions on their development plans. Hence, these companies realize that the real launch of its support and consolidate of the foundations of sustainability and promote the successes will be more effective and durable when they received more support and backup from the member countries.

It is out of the question that the OAPEC-Sponsored Ventures are looking forward for continuous auspices and support from the member countries of the organization, they hope that Arab markets would be open to its activities, on a competitive basis, if not on the basis of preference.

The activities of each venture are summarized below:

1- Maritime Petroleum Transport Company (AMPTC)

The Arab Maritime Petroleum Transport Company (AMPTC) was established in State of Kuwait on 6 May 1972 and commenced its activities on January 1973, with an authorized capital of US$200 million and paid-up capital of $150 million.

The shareholders of AMPTC are all member countries except of Syrian Arab Republic, and the objectives of the company are to own, operate and charter a fleet of crude oil and oil products tankers.

The Activities of AMPTC in 2009

The year 2009 turn out to be as one of the worst years that shipping markets has ever witnessed, with successively lower tankers leasing either time charter lease or single trip (Spot), this was due to the global economic crisis, which led to a decline in global demand for charters. The increasing application of strict international requirements by tenants, and the difficulty of obtaining approvals of the major oil companies to accept the carriers, resulted in an increased difficulty in finding opportunities for continuous operation.

In spite of all the difficulties faced in the competitive market for leasing tankers, yet the company has been able to succeed in leasing most of its tankers in the best way that comes in line with supply and demand compared to the situation of transport markets. It was possible to lease some tankers based on time charter system for reasonably long periods (one to three years), some other tankers were leased in the free market based on single trip system (Spot).

The company works hard to reduce the pause time, and to utilize the tankers in the international markets in the best way possible, this has kept the company away from the pause time, and from the fluctuations of the international market, and enabled it to maintain reasonable flow of revenues.

As for the gas carriers, they are used in a project to transport and supply the gas to and from the member countries of the company. During high temperature season- in which demand for liquefied natural gas decreases- the tankers are leased based on single trip system (Spot) to avoid pause time.

The company has worked hard during 2009 to intensify its marketing efforts both within contributing countries or worldwide, in order to create opportunities for its operational tankers that are not on time charter lease, along with the study of all operational alternatives, and the possibility of

entering into partnerships with oil companies in the contributing countries or other international companies to operate its tankers to in order to compensate for failures it faced in the market of oil maritime transport, especially that the company enjoys universal acceptance, and has a long experience in the field of oil maritime transport.

The company has adopted the policy of risk allocation, and included in its work program additional activities in support for its operations in order to achieve profit depending on the company's expertise accumulated over the past thirty-seven years, and take advantage of its staff that have managed before to achieve additional revenues to offset a lot of carriers operating losses due to the low and stagnant markets.

For the eighth year AMPTC continuous the operations of transporting and supplying of liquefied natural gas to and from the member countries of the company, annual contracts undertaken by the company to transport and supply liquefied natural gas to both Egypt and Iraq reach about 2 million tons per year. The company has contracts to buy gas from the member countries represented by Saudi Aramco, Kuwait Petroleum Company, Qatar International Petroleum Marketing Company Ltd. (Tasweeq) of Qatar and Sonatrach of Algeria.

AMPTC on the other hand is currently working on increasing the number of its tanker and modernize its fleet so that it can compete in the international market, it is also working on reducing the average age of its tankers to avoid obsolescence and keep pace with developments in the global market when they boom again.

The Company's Financial Results for 2009

Income of operating the tankers in 2009 reached about $ 92.44 million, while the operating cost of the tankers (without depreciation) was $ 45.66 million. The depreciation of the tankers amounted to $24.45 million.

With regard to gas supply and import projects, AMPTC achieved net profit of about $ 14.88 million. The final result of the company's activities in 2009 was a net profit of $ 23.84 million.

Financial Results for the First Half of 2010

During the first half of 2010, the revenues gained from vessels lease reached $ 50.11 million, while the operating cost of the tankers was $ 31.15 million. The depreciation of the tankers amounted to $12.23 million. By adding returns of deposits and current accounts in banks, financial results of the company for the first half of 2010 show a net profit of $ 367 thousand.

II. The Arab Shipbuilding and Repair Yard Company (ASRY)

The Arab Shipbuilding and Repair Yard (ASRY) was established on 8th December 1973 with a fully paid-up capital of US $340 million (issued and paid-up capital amounted to US$170 million). The headquarters of the company is located in Al-Manama, Kingdom of Bahrain. Shareholders are all the member countries in OAPEC except for Algeria, Syria and Egypt. The objectives of ASRY cover building, repair and maintenance of all types of ships including tankers and other marine transport vessels that are related to the shipping of hydrocarbons.

The Activities of ASRY in 2009

Global economic drawback recorded in the last two years has had its negative effect on many industries including shipbuilding, navigation, maritime transport and repair yards. The effects were so extreme in the last year that many companies and shipyards suffered heavy financial losses as compared with previous years

Some have noticed indications of a slowdown before the end of 2008, but no one predicted how the global financial crisis would be and how it would directly colliding with the economic decline worldwide.

The year 2009 was a challenge for ASRY after the excellent performance recorded in 2008. The company was able to control business in this difficult year, this has required so much effort, work and marketing activity, the company was able to make relatively low profits, yet, this was a good achievement, especially if we know that many of shipyards have suffered losses while others were even closed in 2009.

A record of 168 vessels were repaired in 2009, representing 26% increase in compare to the previous year. The main problem was the owners, operators and managers spent only the minimum on repairs because of poor market conditions.

A promising market emerged as ASRY's yard is equipped with capabilities and experiencesto repair naval military vessels. Choosing ASRy to repair such technically- complicated vessels in the Arab gulf is merit for the company.

Two new parallel slipways entered the service last year, which created a new opportunity to add to the capabilities of ASRY regarding the size and types of vessels it can repair.

Needless to say, the oil tankers and other ships and drilling rigs do not come for repair in the workshops of the company without a major effort of active marketing and promoting of the services, not only by ASRY, but also by the network of international agents which coordinate with the company. Without the tireless efforts of our agents, much of the repair works ASRY handled could have eneded in other shipyards.

The Company's Financial Results for 2009

Income of 2009 decreased sharply to $ 131.4 million, this is only 37% of 2008 income.

Training and Arabization

In the field of training and Arabization, ASRY continued in 2009 to implement its plans for the development of Arab employees, the objectives of those plans were to hire more Arabian trainees, and to improve the quality of performance and skills of its staff, and to promote them.

The training program included multiple aspects of the company needs in technical and administrative areas to cope with international development in vessels repair and to face the extreme competition in this industry.

The number of Arab employees increased from 814 in 2008 to 832 employees in 2009. As of 31st of December 2008, the number of permanent employees was 1647 employees. The company also employed 30 temporary staff, in peak times the company can get help of subcontractors. ASRY organized various training programs for senior and middle management supervisory, it also conducted 166 professional training courses and plenary sessions for its staff, over 1032 employees involved in these programs.

The Company's Activities in the First Half of 2010

There were 95 vessels repaired at the end of June 2010 compared with 79 for the same period of last year. During this period, the number of specifications received by the company came to 274 compared with 300 standard specification for the same period of 2008.

Financial Results for the First Half of 2010

In the first half of 2010, the ship repair market was affected by the world economic situation, net operating income amounted to $ 72,555,000 compared with $ 80,197,000 in the same period of 2009.

III. THE Arab Petroleum Investments Corporation (APICORP)

The Arab Petroleum Investments Corporation was established in the city of Khobar, Kingdom of Saudi Arabia on 4 September 1974, with all OAPEC member countries as shareholders. The authorized capital of the Corporation was $ 1200 million, and fully paid-up capital of $ 550 million.

The prime objective of APICORP is to participate in the equity, as well as the debt financing of projects in the petroleum industry at large. These include all businesses which are based on the development, processing or transportation of the products of the oil and gas industry and its downstream derivatives, it aims to help member countries to strengthen their capacity to benefit from the petroleum wealth and invest their savings to strengthen their economic and financial capacities.

The Activities of APICORP in 2009

Net profits reached $ 58.5 million in 2009 compared with $ 27.6 in 2008, this represented an increase of 112%. This improvement of net profits is attributed to the improvement of operational income which touched on $ 82 million in 2009. Thereby earnings per share in 2009 increased to $ 106, compared with $ 50 in 2008, an increase of 103%.

The total assets of the company increased to $ 4.119 million in 2009 compared to $ 3570 million in 2008, an increase of 15%. The total equity in APICORP increased by 12% in 2009 compared to the its value by 2008, with total equity of $ 1020 million, compared with $ 895 million by 2008. This improvement is largely due to the high market value of APICORP investments listed in the stock market.

Project Finance and Foreign Trade

Despite the global financial crisis which peaked in 2008 and prevailed in 2009, APICOR continued financing selected projects, such as its participation in financing SATORP Company's refinery in Jubail/ Saudi Arabia, to build a refinery with a capacity of 400 thousand b/d at a cost of $ 12 billion.

By 2009, the net income related to funding the project and trade was about $ 30.1 million (of which $ 7.7 million loans- arrangement fees) compared to $ 29.7 million in 2008.

Equity Contribution to Capital Projects in 2009

APICOR contributes to the capitals of 14 companies located in 6 Arab countries, two of those companies are still under construction, EMethanex is a nearly- completed project, and the Egyptian Bahraini Gas Derivative Company (EBGDCO) where 36% of the project activates are completed. On the other hand, working on expanding Mopco Company –previously known as Agrium project- has touched on more than 50%. As for Yansab Company, it started commercial activities on Marsh 2010.

By 2009, the net fair value of APICORP investment portfolio amounted to $ 339 million compared to $ 283 million in 2008, representing an increase of 20% mainly due to the increase of the market value of the investments of the portfolio in the Stock Market.

Financial statements for the year 2009 showed that the profits received from contributions continued to track upward to about $ 59 million compared to $ 58 million received in 2008.

Financial Results for 1st half of 2010

APICORP achieved a net profit of $ 47 million in the first half of 2010, this represents 95% increase compared to the same period of the last year. Total income of the company increased by 75% compared to the same period of the last year reaching $ 52 million. The company assets increased to $ 4.3 billion by 31 of December 2009, the rights of the shareholders increased also to $ 1,069 million compared to $ 1,002 million by 2009. Total company's assets reached $ 4,306 million in 30 June 2010, compared to $ 4,119 million in 13 December 2009. This growth represented a success of the company's efforts to attract more deposits from companies operating in the region.

APICORP obtained high credit rating (A1) from Moody's Corporation for long-term debts, and (Prime-1) for short-term debts. It is worth mentioning that this was the first time the for the company to enter the credit rating market. Immediately after the announcement of the distinguished credit rating of APICORP in the markets, this was reflected on the indicators of the margin cost of borrowing, where the indexes went down by an average of about 100 basis points (1%) off the indicators before the announcement of the classification. Since November 2009, APICORP started setting up to enter the regional borrow bond market, APICOR bonds in Saudi Riyals were widely welcomed. The initial target amount of Saudi Riyals 1875 million was raised to Saudi Riyals 2 billion.

Priced at 110 basis points over the Saudi Interbank Offered Rate (SIBOR), the five-year bond witnessed extraordinarily high demand from

investors in a remarkably short book-building period, resulting in a price that was tangibly at the lower end of the range. The bond which is callable after three years at the option of APICORP is the first such structure in the Saudi capital markets, the bond was oversubscribed three times, and the total subscription reached about Saudi Riyals 6 billion, leading APICORP to enjoy the targeted lowest marginal cost.

Project and Trade Finance in the 1st half of 2010

A remarkable -yet vigilance- improvement was noticed in the financial market in the first half of 2010, activities of financing projects have not resumed its business- as usual despite the presence of a number of funding opportunities in the regional market. The company was able-despite the difficult conditions being experienced by the lending market in the region- to maintain the level of profit achieved during the first half of 2010 from finance and international trade, which amounted to about $ 14 million.

Equity Contribution to Capital Projects in the 1st half of 2010

Expected profit approved to gain in 2010 are about $ 67 million, $ 66 million received so far compared to $ 58.5 million representing 2009 profits, this forms an increase of 114%. APICORP is still pursuing a number of investment opportunities and evaluating some of them. As part of its strategy for the next five years, the company has intensified its activities in the areas of establishment of investment funds, and exit of some of the old contributions, in order to achieve capital gains and recycling of these profits into new projects, and lead the work to advanced stages.

Information Systems

In 2009, the information system department continued to work on the development of banking systems and their applications after the start of work in the banking unit of the company in Bahrain. Numerous accomplishments in this area included the application of (FX Swap) and (Interest Rate Swap) system specialized in (Global Banking System T24) and installation of a system for call recording and retrieval at

treasury and capital markets department, as well as upgrading the Oracle system to meet the needs of personnel management, in addition to the installation of "Society for Worldwide Interbank Financial Telecommunication service" (Swift) in the company's headquarters. Financial and banking application systems have been developed in preparation to issue medium-term bonds in Saudi Riyals, to cope with the procedures for issuance of bonds, through the operating of Global Banking System-Security Module and linking it with Oracle system.

Training and Manpower

The corporation has 118 employees, 70% of them are Arab nationals (82 employees), and 36 are non-Arab employees.

In accordance with the strategy of human resources, the company -when needed- attracts experienced Arab and non-Arab to the company to fill some of the technical and specialized jobs that require appropriate expertise, to achieve the targeted growth and expansion of the company's operations in the coming years.

The company started the implementation of a comprehensive plan to improve the working environment by modernizing the system of grades and salaries. The company prepared a study by think-tank dedicated to reviewing and developing the administrative organizational structure to keep pace with expansion, including a plan for the development and qualification of staff to improve the overall performance of career and vocational.

IV. The Arab Petroleum Services Company (APSCO)

The Arab Petroleum Services Company (APSCO) was established on the 23rd of November 1975 as a holding company based in Tripoli, Libya, with all OAPEC member countries as shareholders. The company's authorized capital was 100 million Libyan dinars (LYD), and subscribed and paid-up capital was LYD 15 million. APSCO's objective is to provide

petroleum services which used to be monopolized by major oil companies which have the techniques and expertise and possess the skills in that field, through the establishment of companies specialized in one or more branches of Petroleum Services.

The Activities of APSCO in 2009

APSCO focuses on improving and developing the activities of the existing specialized companies, namely:

- Arab Drilling and Workover Company (ADWOC)
- Arab Well Logging Company (AWLCO)
- Arab Geophysical Exploration Services Company (AGESCO)
- Another target is to expand the its affiliates and study the possibility of opening branches for some of them in other member countries.

APSCO's Financial Results in 2009

Total revenues of Arab Petroleum Services Company (APSCO) amounted to 4,658,306 Libyan Dinar in 2009. While net profit- after deducting administrative expenses of LYD 2,491,400 and adding the amount of LYD 195,060 amendments of previous years- reached LYD 2,361,966. This comprises 10% or LYD 236,169 in legal reserve, and leaves the remainder of LYD 2,125,779 to determine the period profit, bringing the total retained earnings to LYD 5,379,250.

The Company's Activities in the 1st half of 2010

APSCO continued to monitor and support its three affiliates companies, and study the possibilities of future projects to participate in.

Training and Manpower

As of 30/6/2010, the number of employees was 19, all of Arab nationality.

APSCO's financial results in the first half of 2010

Financial results of APSCO's in the first half of 2010 were as depicted in following table:

Total Revenues	3,500,422 Libyan Dinar
Total Expenses	1,511,695 Libyan Dinar
Total Profits	1,988,727 Libyan Dinar

One million, nine hundred and eighty-eight thousand seven hundred and twenty-seven Libyan Dinars

1. Arab Drilling and Workover Company (ADWOC)

ADWOC was established in Tripoli, Libya, in 1979. The company is the main subsidiary of the Arab Petroleum Services Company (APSCO).

The other shareholders are the Arab Petroleum Investments Corporation (APICORP) and the Kuwaiti owned Santa Fe International Company. The mission of ADWOC involves onshore and offshore drilling operations, well maintenance, drilling water wells, and performing other technical operations associated with drilling in member countries, as well as other countries.

Arab Drilling and Workover Company is a company specialized in drilling and maintenance of oil and gas wells on land and offshore. It was established under the international agreement signed in 1979 between three companies: the Arab Petroleum Services Company, the Arab Petroleum Investments Corporation and Santa Fe International Services Inc., with an authorized and paid capital of LYD 12 million, this was subsequently increased to LYD 60 million. Is headquartered is in the city of Tripoli, Libya. Santa Fe has sold its stake in the company to First Energy Limited in 2009.

1- The Company's Activities in 2009

When established, ADWOC has had four old rigs as a contribution of

Santa Fe Company, and three new rigs contributed by the Arab Petroleum Services Company. Currently, the company has now 17 rigs of various sizes, including 10 rigs working in drilling and 7 in the field of maintenance, in addition to a fleet of heavy transport and some other equipment.

In its main camp in the Libyan desert, the company runs an integrated complex of workshops include a workshop for the maintenance of heavy and light transportation fleet, a workshop for the maintenance of diesel engines, and many turnery and black smith workshops. In a unique step, the company has recently opened Blow- Out Preventers workshop (BOP), which is the first of its kind in Libya.

The company used to adopt a policy based on self- financing through different loans, some of which came from Arab financing bodies. Since it was established, ADWOC has achieved a very good operation rate of its rigs that reach 90% in most cases. Despite the stagnant of drilling market in the second quarter of 2009- due to global crisis- the operation rate reached 92.6%.

In response to increased demand for drilling services during 2009- 2010, the company put into effect the minutes of the board of directors to expand its operations to meet the growing demand.

Currently, the company operates 24 rigs, 10 of them owned by it and 7 are rentals, in addition to 7 well services rigs owned as well by the company.

ADWOC has met all its financial obligations of 2009, it has also geared up all the rigs -either owned or rentals- to be In services. On the financial side, the company has fulfilled all the borrowing conditions, without any note against lenders. The company also amended the salaries to meet the challenging market which became very critical with more International companies working in Libya.

As for selling its stake in ADWOC, Santa Fe Inc. offered its share in the company to the partners in the fourth quarter of 2009, APICOR and APSCO turned down the offer, and the share was acquired by First Energy bank of Bahrain after long negotiations with Senta Fe.

2- Training and Manpower

Training department has put a training plan for new trainees in order to meet the high and increasing demand for technical manpower and to meet the company's expansion plan in the future. Training department has also prepared a number of internal and external courses to familiarize the trainees with the nature of their work, especially in terms of safety precautions, and the development of a large number of tool pushers and drillers in the field of BOP and well control. Most of them got a certificate from International Well Control Forum (IWCF), such certificates are renewed continuously on biennial bases. the department worked also on introducing the company's employees to the drilling problems so that they may reach the required level of competency, 52 trainees attended these courses. Moreover, ADWOC runs contentious domestic and external training courses. The company has maintained and renewed a certificate of ISO 9001for a further period, it is seeking a range of other certificates that support the company's position in the face of serious competition with international companies operating in drilling sector.

3- Financial Results in 2009

The company achieved remarkable profit of 29,587,609 Libyan dinars in 2009, equals to $ 23,701,000. This was $ 3,617,000 less than 2008 profits. The company's General Assembly decided to distribute a dividend of 50% of the distributable profits, after deducting all reserves for the fiscal year ended in 31/12/2009.

4- The Activity of the Company During the First Half of 2010

The first six months of 2010 witnessed a stable demand for drilling operations so that some companies have cut down drilling programs, this has led many drilling contractors to reduce the number of acting rigs. As a result, ADWOC decommissioned one of its rigs for a while, it was shortly put in service again where the company offered lower tariffs.

No improved drilling activities were recorded in the company's headquarter country, one of the reasons was the delay in approving petroleum companies budgets, 18 rigs are currently stalled and some of them are not in good condition. Demand for drilling services is expected to grow after the relative waning of the economic crisis effect on some institutes and countries.

5- Financial Results in the First Half of 2010

ADWOC net profit by the first half of 2010 reached $ 10,838,904.

The Arab Well Logging Company (AWLCO)

AWLCO is an affiliate of the Arab Petroleum Services Company, it was established in Baghdad, Iraq, on 24 March 1983 with an authorized capital of 7 million Iraqi dinars, with all OAPEC member countries as shareholders. The company is specialized in performing well logging and perforation operations, and other well-related technical operations necessary for discovery and development of oil fields. AWLCO owns two operation centers one in the southern Iraq and the other in the north.

1- The Company's Activities During 1/1/2009- 30/6/2010

In 2009, the company continued its logging and perforations services all over Iraqi fields, notices on its activities are:

- Increase the number of operations that have been implemented for a number of companies.
- Increase the company's revenues through the development of the services provided.
- Increase the company's profits through higher revenues and lowering the costs as possible.

- Provide logging and perforations services for private companies contracting with the Iraqi Oil Ministry.

- Provide new services to the corporate sector, such as logging to measure the erosion of casing.

- Using a part of its profit, the company managed to buy a number of vehicles, equipments and spare parts.

- The company continued conducting the maintenance and rehabilitation of facilities, vehicles and old equipments to keep running activates.

All these jobs were accomplished based on contracts signed with South Oil Company, North Oil Company and private sector companies.

The company's business has doubled the revenue year after year, which enabled it to achieve good profit, as the logging and perforation operations reached 526 successful operations during 2009 and the first half of 2010. The income and profits for the same period amounted at $ 14,600,828 and $ 8,200,652 respectively.

2- Relations with the Iraqi Beneficiaries

Coordination with the oil ministry and its central departments, North Oil Company and South Oil Company and other exploration companies on the requirements of various jobs has continued, for instance:

- The ministry of oil directed its operating companies in the exploration sector to give priority in contracting with logging companies based in Iraq.

- The ministry of oil increased the cost of 2010 operations by 40%.

- Nine million dollars were earmarked for the company regardless of its debts, the amount is to be repaid as 25% of ravenous of machines and equipments that would be purchased to improve the activities of the company to enable it to cope with the technical developments.

- The ministry has provided the company with all types of fuels and job requirements.

- Providing the necessary protection for the company and its staff particularly when transporting perforation bullets.

- Signing logging and perforation contracts with exploration companies worth $ 16 million, required approvals for the same are to be procured.

- The ministry provided stores to keep perforation tools and equipments.

- The exploration companies have paid all the costs of the operations of 2009, while advanced payments were submitted for 2010 operations, total cost will be settled by the end of the year as usual.

- The company's debts settlement.

- Discussion of repayment method of outstanding debts owed by the company on the ministry of oil.

- The ministry provided different appropriate jobs of logging and perforation, along with some technical assistance to execute them.

The company currently has seven logging trucks, six of them are brand new, those were distributed to the jobs centers according to the required jobs size. The company has also purchased a number of cranes and field vehicles to use them in the field operations.

3- Training and Development

During 2009 and first half of 2010, a number of the company's employees followed in- the house training courses within Iraq, this was as follows:

- Training of two engineers and one maintenance officer in the factories of SDS Company.

- Training of eight staff of different levels in Turkey within an American company on using and storing of perforation equipments.

- Training of two engineers in China on open- hole logging tools.
- Training of three engineers in China on casing corrosion- logging interpretation.

4- Staff of the Company

The company's staff totaled 67 by 2009.

5- Financial Results of the Company

The company continued executing its program of 2009 and 2010, and has undertaken contracted logging and perforation jobs in the fields of the North Oil Company and the South Oil Company with increasing activities comparing to previous years. AWLCO made profits –as shown hereinafter- and invest a part of them to purchase new equipments.

The company transferred $ 250 thousand of its 2006 profits, $ 200 thousand of 2007 profits, $ 200 thousand of 2008 profits and $ 571,959 of 2009 profits to the Arab Petroleum Services Company.

Arab Well Logging Company made a net profit of $ 5,910,137 in 2009, revenues of the first half of 2010 reached $ 2,290,515. This brings total net profits received during 1/1/2009 to 30/6/2010 to a record of $ 8,200,652.

The Arab Geophysical Exploration Services Company (AGESCO)

The Arab Geophysical Exploration Services Company (AGESCO) was established in Tripoli, Libyan Arab Jamahiriya on 1984 with an authorized capital of 12 million Libyan dinars and a paid-up capital of 4 million Libyan dinars.

Shares of the company go to the Arab Petroleum Services Company (66.66%), the Arab Petroleum Investment Corporation (APICORP) (16.67%) and the Libyan National Oil Corporation (16.67%).

1- The Crews Activities in 2009

Crew (AG-002)

The crew continued acquiring operations in Block MN-100 in favor of the Arabian Gulf Oil Company (AGOCO Oil). By November 2009, the crew acquired 738.73 km2, and then moved to work for Al Waha Oil Company in concession 59 covering 670.13 km2by November. It then moved to work for Sirte Oil Company in Block MN-107 covering 102.58 km2, and covered 25.52 km2in Block MN-107 by December. The crew moved later to Block LP-3D covering 88.45 km2, then it moved to Block MN-106 to cover 42.58 km2by December. As a result, the total work of Crew AG002 in 2009 covered 1805.21 km2.

Crew (AG-003)

Crew AG-003 continued working for Arabian Gulf Oil Company in Block MN-18 covering 1725.98 km2 in 2009.

Seismic data Processing Center

In 2009, the seismic data processing center continued to process onshore and offshore 2D and 3D seismic data for the following companies: Gazprom, RWI of Taiwan, Verenex, Statoil, Shell, Wintershall,Exxon Mobil, Total, Petrobras and Rimsa of India.

2- Training and Manpower

The company pays a special attention to the on- job training programs, through local and external courses. It ran two local- English training courses, two external courses on seismic acquiring tools and one course on auditing.

Number of the company's employees was 752 by 2009, of whom 613 are Libyan, 99 of Arab nationalities and 40 of other nationalities.

3- Financial Results in 2009

In 2009, the company's revenues totaled LYD 59.566 millions, and total expenses were LYD 55.459 millions. This led AGESCO to achieve a net profit of LYD 7.107 millions.

4- Crews Activities in the First Half of 2010

Crew (AG-002)

The crew continued acquiring seismic data in Block MN-106 for Sirte Oil Company, covering 355.42 km2 by February, it then moved to work for AGOCO in Block MN-100 covering 794.09 km2. During the report period the crew covered 1149.51 km2.

Crew (AG-003)

The third crew continued acquiring seismic data in concession 65 for AGOCO covering 283.70 km2 by February. It then moved to work for the same company in Block 66 in Hamada covering 815.57 km2 during the report time.

The two crews have collectively acquired 2248.78 km2 in the first half of 2010.

Seismic data Processing Center

The seismic data processing center have processed data for Exxon Mobile, Total, the Polish, Shell and Risma.

Crew Shared with WesternGeco

This crew continued in the course of 2009 and the first half of 2010 to execute seismic survey for BP, it has provided WesternGeco with some topographic tools and equipments against monthly rental, this contract is concluded by 2010.

5- Financial Results in the First Half of 2010

In the first half of 2010, the company's revenues totaled LYD 32.068 millions, and total expenses were LYD 26.314 million. The net profit amounted to LYD 5.754 millions.

6- Staff

By the first half of 2010 number of staff was 762, 621 of them were of Libyan nationality, 100 of Arab nationality and 41 of other nationalities.

Arab Company for Detergent Chemicals (ARADET)

The company was established in Iraq on 12/3/1981, with an authorized capital of 72 million Iraqi dinars, and subscribed and fully paid-up capital of 36 million Iraqi dinars. Equity in the company is held by three member countries (Iraq, Saudi Arabia and Kuwait), in addition to Arab Petroleum Investments Corporation (APICORP), the Arab Company for Mining, Jordan, and the Arab Investment Company.

1- The Company's Activity in 2009

The company witnessed a remarkable development in the area of operation and marketing in 2009, and achieved excellent results thanks to the continuous received support from the Iraqi oil ministry and the board of directors, and due to rehabilitation of production line of alkyl benzene, the installation of new unit, the stability of voltage and continue processing of feedstock in 2009. The company achieved record sales worth more than $ 52 million in 2009 as a result of the high demand for the company's products, where 36,500 tons out of about 36 700 tones of alkyl benzene were marketed produced during this year. During the year, the company also marketed the surplus of the mid-products like 7400 tons of paraffin, 5950 tons of B.T.X.

2- Financial Results of 2009

The final accounts of the company for the year 2009 showed net profit of $ 11.6 million comparing to a loss of $ 1.7 in 2008. The profit came mainly as a result of the increased quantity and value of the company's products, especially after the accomplishment of the production units of the alkalization and paraffin, in addition to the contribution of the amendments made to the convention of the processing of raw materials, and linking its preparation rate in parallel to delinquency in the specification of raw materials received from the North Refineries Company. In the light of these good results the general assembly of the company decided to distribute 50% of the profits accruing in 2009 equivalent of $ 5.8 million to its shareholders.

3- Manpower and Training in 2009

Workforce of 2009 was characterized by the stability of the remaining staff, young cadres were appointed to fill the vacancies in the company's property. The total number of employees in the company at the end of 2009 was 331, 292 of them were of Iraqi nationality, and the rest of the Arab nationalities. The senior staffs have run short-term training courses in some of the technical aspects for the new recruits in the company's compound. Some of cadre followed courses on technical, administration, accounting and computing issues, the courses were held in universities, offices and specialized institutes inside and outside the headquarters' country.

4- Activities of the Projects Section in the First Half of 2010

- Completing the installation of water chiller for the Molex unite of paraffin line in order to improve its efficiency and enable it to work at high capacity in summer time.
- Completing a technical and economic study for aromatics line, by contracting with GTC Technology.
- Completing the third stage of cathode protection study in the company's compound, and starting the project.

- Starting the preparation stage of installing two brand new 500 tons tanks to use them in storing the company's products.

- The company contracted to complete new systems to automate the company›s activities.

- Completing a study about improving the performance of critical operating pumps, and developing practical solutions to overcome the problems of retreated performance.

- The company continued to develop the skills of its technical and administrative staff by participating in courses and workshops either locally or internationally to brief them on developments in the area of their business.

5- Financial Results in the First Half of 2010

Net profit by 30/6/2010 reach $ 8.2 million comparing to net profit of $ 1.2 million that was achieved in the first half of 2009.

6- Manpower and Training During the First Half of 2010

Training and development continued through on-site technical courses, and delegating many employees to follow specialized courses within the country, in addition to delegating 30 employees to training course in Hashemite Kingdom of Jordan, Syrian Arab Republic, China and Turkey.

Number of staff was 336, among them 294 were Iraqis, and the rest were of Arab nationalities.

APPENDICES

PRESS RELEASES OF OAPEC MINISTERIAL COUNCIL MEETINGS IN 2010

1- The Eighty – Fourth Meeting of OAPEC's Council of Ministers

OAPEC's Ministerial Council held its 84th meeting in Damascus, Syrian Arab Republic in 31/5/2010 at the level of the executive bureau members; the meeting was chaired by H.E. Eng. Muhammad Nasser Al Sharhan, representative of the United Arab Emirates, which holds the chairmanship of the executive bureau in its current session (2010).

H.E. the chairman welcomed the executive bureau members who represent the ministers, and expressed his thanks and appreciation to Syrian Arab Republic for the warm welcome and hospitality, and hoping for the council meeting every success in deliberations regarding the meeting agenda. On his part H.E. Abbas Ali Al-Naqi, Secretary General of OAPEC, welcomed the executive bureau representatives of member countries, wishing success for the meeting, and expressed his appreciation and thanks to the Syrian Arab Republic for the warm welcome and generous hospitality.

The Council then endorsed the draft agenda, where it approved the final accounts of the organization (General Secretariat and the Judicial Tribune) for the year 2009. The council then reviewed the Secretary General's report about the activities and results of the Ninth Arab Energy Conference which was held in Doha, the State of Qatar, during 9- 12 May 2010.

The council reviewed reports regarding the conducted work in the data bank, the following up of environmental issues, meetings and seminars took part and which will be organized, in addition to the studies carried out by the General Secretariat.

The Ministerial Council of the Organization has already decided in the 83rd meeting to hold the 85th meeting on 25/12/2010 in Sharm el-Sheikh, Arab Republic of Egypt.

The Council concluded its meeting, expressing its thanks and gratitude to the Syrian Arab Republic for the warm welcome and hospitality and for facilitating the success of the meeting.

Damascus: 17 Jumada II 1431 H, corresponding to 31May 2010.

2- Eighty-Fifth Meeting of OAPEC'S Concil of Ministers

The Ministerial Council of the Organization of Arab Petroleum Exporting Countries (OAPEC), held its 85th meeting on Saturday, 19 Muharram 1432 H, corresponding to 25 December 2010 in Cairo, the Arab Republic of Egypt. The meeting was chaired by H.E. Mohamed Bin Dhaen Al Hamly, Minister of Energy in the United Arab Emirates which has the chair for the current session.

The meeting was opened by the Chairman who welcomed their Excellencies wishing them all success for the deliberations of the meeting agenda, and stressing on the importance of cooperation among the member countries to achieve the goals of the organization.

H.E. welcomed Dr. Youcef Al Youcefy Minister of Energy and Mines in the Republic of Algeria and H.E. Abdul Kareem Liaibi Bahidh Minister of Oil in the Republic of Iraq, who are attending the Council's Meeting after being appointed on the top of petroleum sector in their countries, wishing them success in their tasks and looking forward to their contribution in supporting the work of the organization.

In his part, H.E. Eng. Samih Fahmi the Minister of Petroleum in the Arab Republic of Egypt, welcomed their Exellencies, and called the General Secretariat to coordinate with the League of Arab States on following -up the global financial crisis and its impact on the economies of Arab countries by updating the study prepared by the General Secretariat of OAPEC on the subject, so it may be presented as one of the papers in the second Summit of the Arab Economic Social and Development, which will be held in Sharm el-Sheikh in January 2011.

H.E. Abbas Ali Al-Naqi, the Secretary General of OAPEC welcomed their Exellencies the ministers wishing them successful deliberations and discussions, and looking forward to their continued support for the organization's activity.

Afterwards, the Council reviewed topics on its agenda and took appropriate decisions regarding them. The major topics were:

1 - Approving budget estimates of the Organization (the General Secretariat and the Judicial Tribunal) for 2011 at KD 2,053,800 (two million and fifty-three thousand and eight hundred Kuwaiti dinars).

2 - Appointing "Bassam & Partners" as auditors of the Organization's accounts (General Secretariat and Judicial Tribunal) for 2011.

3 - Reviewing the Secretary General's report about the results of the Ninth Arab Energy Conference which was held in Doha, Qatar during 9- 12 May 2010, with special focus on the importance of conference recommendations.

4 - Announcing the names of the OAPEC scientific award winners for 2010. The main subject of the award was: Results of New Technologies Application in Petroleum Exploration and Production in Arab Countries, and its Economics. The Jury decided the following:

- Withholding the first prize of 7000 KD
- Splitting the second prize of 5000 KD equally between the research presented by Dr. Eng. Khaled Ahmed Al Khalaf of the Syrian Arab Republic, entitled " The results of applying 3D seismic surveys and horizontal drilling technologies on exploration and oil production operations in Syria ", and the research presented by Dr. Musab Badr Eddin Al Braidy of the Syrian Arab Republic, entitled "Using the chemical injection method ASP to increase the oil sweep efficiency in Dero oil field, Syria."

The history of this award goes back to 1985, when it was created by the Ministerial Council of the organization, in order to promote scientific research in the field of petroleum and energy industries. Since 1988, many Arab and foreign researchers submitted their research works for the award, selecting studies and researches comes according to the research topics proposed by General Secretariat of the organization and approved by the Ministerial Council, such topics are related to the extent of progress in the fields of basic or applied scientific researches that contribute to the development of petroleum production techniques in all stages, and improve the economics of basic oil projects in the petroleum industry. The award was granted to researchers from different Arab countries and in various areas of the petroleum industry. The subject of the award is chosen on biennial basis. Selecting the subject of the award is linked to petroleum industry to guide researchers to, and then a scientific committee (jury) formed by the Secretariat reviews the research works submitted to select the winners. Full texts of the winning researches are then published the in the "Oil and Arab Cooperation" journal issued quarterly by the General Secretariat of the Organization.

5- Adopting the recommendation of the Executive Bureau regarding OAPEC scientific award for 2012 "Unconventional natural gas resources in the Arab countries and the possibility of utilizing them".

6- Adopting the recommendations of the Executive Bureau regarding the activity of the organization in the subjects related to data bank development, and organizing or participating in of seminars and workshops, and the studies prepared by the General Secretary.

7- Reviewing a report on the activities of projects of companies emanating from the Organization. Furthermore, the Council was informed of the results of the 39th coordination meeting of the officers in charge of these projects, which was held in Manama, Kingdom of Bahrain on 24 October 2010.

8- Extending Iraq's supervision over the Arab Petroleum Training Institute for one more year with effect from 1 January 2011.

9- The council approved the renewal of the services of H.E. Abbas Ali Al-Naqi the Secretary General for three years effective from 1st March 2011.

10- Kingdom of Bahrain presides over the next session (2011) of OAPEC's Ministerial Council and the Executive Bureau, in accordance with the alphabetical order of member countries, as of 1 January 2011.

11- Agreed to convene the next Ministerial Meeting in Cairo, on 24 December 2011.

Cairo, 19 Muharram 1324 H, corresponding to 25 December 2010.

Organization of Arab Petroleum Exporting Countries (OAPEC)