

# CHAPTER FOUR

## ENERGY

The increased chaos in Iraq and fluctuations in its crude oil production were among factors affecting crude oil supply and its price in the review year. Since the beginning of 1382, suspending the quotas was one of the measures taken by the OPEC to send a strong message to the market that OPEC is decided to curb oil prices. Thus, OPEC member countries were allowed to produce crude oil at their full capacity by the end of May 2003.

### OPEC

#### Primary Energy Consumption

Primary energy consumption by OPEC member countries increased from 518.3 million tons oil equivalent in 2002 to 534.2 million tons oil equivalent in 2003, largely including oil and natural gas. Hydro-electricity and coal are consumed by Iran, Venezuela and Indonesia sparingly. Middle East members including Saudi Arabia, Iran, Kuwait, U.A.E. and Qatar with total consumption of 333.2 million tons oil equivalent, had a higher amount of consumption compared to other members (Venezuela, Indonesia and Algeria). Iran with 129.1 million tons oil equivalent consumption ranked the first among OPEC members and Saudi Arabia with 121.9 million tons oil equivalent consumption was the second.

OPEC PRIMARY ENERGY CONSUMPTION IN 2003(1)						(million tons oil equivalent)
	Oil	Natural gas	Coal	Nuclear energy	Hydro electricity	Total
<b>Middle East members</b>	<b>151.4</b>	<b>178.9</b>	<b>0.7</b>	<b>0</b>	<b>2.0</b>	<b>333.2</b>
Saudi Arabia	67.0	54.9	0	0	0	121.9
Iran	54.0	72.4	0.7	0	2.0	129.1
Kuwait	13.7	7.5	0	0	0	21.2
United Arab Emirates	15.0	33.7	0	0	0	48.8
Qatar	1.7	10.4	0	0	0	12.2
<b>Other members</b>	<b>87.8</b>	<b>77.7</b>	<b>19.6</b>	<b>0</b>	<b>16.1</b>	<b>201.0</b>
<b>Total</b>	<b>239.2</b>	<b>256.6</b>	<b>20.3</b>	<b>0</b>	<b>18.1</b>	<b>534.2</b>

Source: BP Statistical Bulletin, 2004

(1) Excludes Iraq, Libya and Nigeria.

#### Crude Oil Reserves

OPEC crude oil reserves rose to 882 billion barrels in 2003, up by almost 0.1 percent as compared with 2002. Among OPEC 11 member countries, the largest reserves belong respectively to Saudi Arabia (262.7 billion barrels), Iran (130.7 billion barrels), Iraq (115 billion barrels) and Kuwait (96.5 billion barrels).

**OPEC PROVEN OIL RESERVES**

(billion barrels)

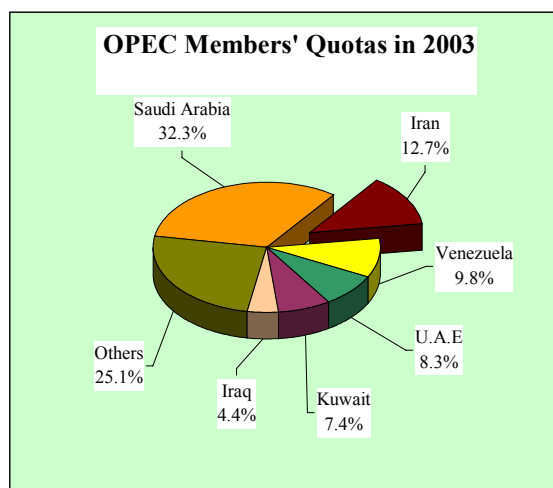
	2001	2002	2003	Percentage change		Share (percent)	
				2002	2003	2002	2003
<b>Middle East members</b>	<b>686.3</b>	<b>718.0</b>	<b>717.9</b>	<b>4.6</b>	<b>*</b>	<b>81.4</b>	<b>81.4</b>
Saudi Arabia	262.7	262.8	262.7	0	*	29.8	29.8
Iran	99.1	130.7	130.7	31.9	0	14.8	14.8
Iraq	115.0	115.0	115.0	0	0	13.0	13.0
United Arab Emirates	97.8	97.8	97.8	0	0	11.1	11.1
Kuwait	96.5	96.5	96.5	0	0	10.9	10.9
Qatar	15.2	15.2	15.2	0	0	1.7	1.7
<b>Other members</b>	<b>161.6</b>	<b>163.6</b>	<b>164.1</b>	<b>1.2</b>	<b>3.0</b>	<b>18.6</b>	<b>18.6</b>
<b>Total</b>	<b>847.9</b>	<b>881.6</b>	<b>882.0</b>	<b>4.0</b>	<b>0.1</b>	<b>100.0</b>	<b>100.0</b>

Source: BP Statistical Bulletin, 2004

**Crude Oil Production**

Average crude oil production in OPEC member countries in 2003 increased by 6.6 percent compared to 2002 to 30.4 mb/d. The output increase and sufficient crude supply helped stabilize the market. Middle East members raised their production by 9.3 percent to 20.7 mb/d, and other members by 1.3 percent to 9.7 mb/d. Saudi Arabia with 32.3 percent share and a production of 9.8 mb/d ranked the first.

OPEC production ceiling which was unchanged at 21.7 mb/d during 2002 increased to 23 mb/d since 1<sup>st</sup> January, 2003. This was due to the political conditions of the region and to ensure sufficient supply and restore market equilibrium. It further increased to 24.5 mb/d since 1<sup>st</sup> February. Launching US military attack on Iraq, member countries pledged to produce at their full capacities to compensate for any probable supply shortfall. With easing tensions in Iraq and its ensuing effect on oil market, OPEC determined its production ceiling at 25.4 mb/d in its 128<sup>th</sup> meeting, and then reduced it to 24.5 and 23.5 mb/d, respectively in its 129<sup>th</sup> and 130<sup>th</sup> meetings considering market conditions and sufficient supply.


**OPEC CRUDE OIL PRODUCTION (1)**

(thousand b/d)

	2001▲	2002▲	2003	Percentage change		Share (percent)	
				2002	2003	2002	2003
<b>Middle East members</b>	<b>20,450</b>	<b>18,927</b>	<b>20,687</b>	<b>-7.4</b>	<b>9.3</b>	<b>66.4</b>	<b>68.1</b>
Saudi Arabia	8,992	8,664	9,817	-3.6	13.3	30.4	32.3
Iran	3,734	3,420	3,852	-8.4	12.6	12.0	12.7
Iraq	2,371	2,030	1,344	-14.4	-33.8	7.1	4.4
Kuwait	2,069	1,871	2,238	-9.6	19.6	6.6	7.4
United Arab Emirates	2,430	2,159	2,520	-11.2	16.7	7.6	8.3
Qatar	854	783	917	-8.3	17.0	2.7	3.0
<b>Other members</b>	<b>9,808</b>	<b>9,576</b>	<b>9,696</b>	<b>-2.4</b>	<b>1.3</b>	<b>33.6</b>	<b>31.9</b>
<b>Total</b>	<b>30,258</b>	<b>28,503</b>	<b>30,383</b>	<b>-5.8</b>	<b>6.6</b>	<b>100.0</b>	<b>100.0</b>

Source: BP Statistical Bulletin, 2004

(1) Includes NGL, shale oil and oil sands.

**OPEC PRODUCTION QUOTA**

(mb/d)

	January 2003	February 2003	20 March 2003	June 2003	November 2003	April 2004
Saudi Arabia	7.476	7.963	Full capacity	8.256	7.963	7.638
Iran	3.377	3.597	Full capacity	3.729	3.597	3.450
Others members (1)	12.147	12.940	Full capacity	13.415	12.940	12.412
<b>Production ceiling (1)</b>	<b>23.000</b>	<b>24.500</b>	<b>Full capacity</b>	<b>25.400</b>	<b>24.500</b>	<b>23.500</b>

Source: www.opec.org

(1) Excludes Iraq.

## Consumption of Oil Products

In 2003, average consumption of oil products grew by 1.9 percent to 5.1 mb/d. The most and the least amount of consumption was related to Saudi Arabia and Qatar with 1.4 and 0.04 mb/d consumption, respectively. Iran with 1.1 mb/d consumption accounted for 22.4 percent of total OPEC consumption.

OPEC CONSUMPTION OF OIL PRODUCTS (1)								(thousand b/d)	
	2001	2002	2003	Percentage change		Share (percent)			
				2002	2003	2002	2003		
<b>Middle East members</b>	<b>2,983.0</b>	<b>3,028.1</b>	<b>3,167.8</b>	<b>1.5</b>	<b>4.6</b>	<b>61.1</b>	<b>62.7</b>		
Saudi Arabia	1,347.1	1,363.1	1,436.6	1.2	5.4	27.5	28.4		
Iran	1,127.4	1,114.7	1,132.4	-1.1	1.6	22.5	22.4		
Kuwait	205.7	222.4	265.7	8.1	19.4	4.5	5.3		
United Arab Emirates	272.8	284.2	295.7	4.2	4.0	5.7	5.9		
Qatar	30.0	43.7	37.4	45.7	-14.4	0.9	0.7		
<b>Other members</b>	<b>1,832.6</b>	<b>1,930.6</b>	<b>1,885.0</b>	<b>5.3</b>	<b>-2.4</b>	<b>38.9</b>	<b>37.3</b>		
<b>Total (2)</b>	<b>4,815.6</b>	<b>4,958.7</b>	<b>5,052.8</b>	<b>3.0</b>	<b>1.9</b>	<b>100.0</b>	<b>100.0</b>		

Source: BP Statistical Bulletin, 2004

(1) Includes domestic demand for oil, aviation and navy fuel, fuel for refineries and oil wastes.

(2) Excludes Iraq, Nigeria and Libya.

## Natural Gas Proven Reserves

Natural gas proven reserves remained relatively unchanged in 2003 at 87.4 trillion cubic meters as compared with the previous year. Iran and Qatar with 26.7 and 25.8 trillion cubic meters of reserves, respectively had the highest amount of natural gas proven reserves among OPEC member countries.

OPEC NATURAL GAS PROVEN RESERVES								(trillion cubic meters)	
	2001	2002	2003	Percentage change		Share (percent)			
				2002	2003	2002	2003		
<b>Middle East members</b>	<b>69.5</b>	<b>69.8</b>	<b>69.9</b>	<b>0.4</b>	<b>0</b>	<b>79.9</b>	<b>79.9</b>		
Saudi Arabia	6.5	6.6	6.7	3.0	0.5	7.6	7.6		
Iran	26.6	26.7	26.7	0.3	0	30.5	30.5		
Iraq	3.1	3.1	3.1	0	0	3.6	3.6		
Kuwait	1.6	1.6	1.6	0	0	1.8	1.8		
United Arab Emirates	6.1	6.1	6.1	0	0	6.9	6.9		
Qatar	25.8	25.8	25.8	0	0	29.5	29.5		
<b>Other members</b>	<b>17.1</b>	<b>17.6</b>	<b>17.5</b>	<b>2.6</b>	<b>-0.2</b>	<b>20.1</b>	<b>20.1</b>		
<b>Total</b>	<b>86.7</b>	<b>87.4</b>	<b>87.4</b>	<b>0.8</b>	<b>0</b>	<b>100.0</b>	<b>100.0</b>		

Source: BP Statistical Bulletin, 2004

## Production of Natural Gas

OPEC natural gas production grew by 5.4 percent compared to 2002 to 433.9 billion cubic meters. Algeria with 82.8 billion cubic meters production ranked the first, and Iran with 79 billion cubic meters and accounting for 18.2 percent of total OPEC natural gas production ranked the second among OPEC member countries.

<b>OPEC PRODUCTION OF NATURAL GAS</b>				<b>(billion cubic meters)</b>			
	2001	2002	2003	Percentage change		Share (percent)	
				2002	2003	2002	2003
<b>Middle East members</b>	<b>194.6</b>	<b>212.6</b>	<b>223.5</b>	<b>9.2</b>	<b>5.1</b>	<b>51.7</b>	<b>51.5</b>
Saudi Arabia	53.7	56.7	61.0	5.6	7.6	13.8	14.1
Iran	66.0	75.0	79.0	13.6	5.3	18.2	18.2
Kuwait	8.5	8.0	8.3	-5.9	3.8	1.9	1.9
United Arab Emirates	39.4	43.4	44.4	10.2	2.3	10.5	10.2
Qatar	27.0	29.5	30.8	9.3	4.4	7.2	7.1
<b>Other members</b>	<b>194.6</b>	<b>199.0</b>	<b>210.4</b>	<b>2.3</b>	<b>5.7</b>	<b>48.3</b>	<b>48.5</b>
<b>Total</b>	<b>389.2</b>	<b>411.6</b>	<b>433.9</b>	<b>5.8</b>	<b>5.4</b>	<b>100.0</b>	<b>100.0</b>

Source: BP Statistical Bulletin, 2004

## Consumption of Natural Gas

OPEC natural gas consumption with 3.9 percent rise amounted to 285.2 billion cubic meters. Middle East members consumed 198.8 billion cubic meters of natural gas, up by 3.9 percent compared to 2002, accounting for 69.7 percent of total consumption.

<b>OPEC CONSUMPTION OF NATURAL GAS</b>				<b>(billion cubic meters)</b>			
	2001	2002	2003	Percentage change		Share (percent)	
				2002	2003	2002	2003
<b>Middle East members</b>	<b>176.7</b>	<b>191.4</b>	<b>198.8</b>	<b>8.3</b>	<b>3.9</b>	<b>69.7</b>	<b>69.7</b>
Saudi Arabia	53.7	56.7	61.0	6.5	7.6	20.7	21.4
Iran	70.2	79.2	80.4	12.8	1.5	28.9	28.2
United Arab Emirates	32.3	36.4	37.5	12.7	3.0	13.3	13.1
Kuwait	9.5	8.0	8.3	-15.8	3.8	2.9	2.9
Qatar	11.0	11.1	11.6	0.9	4.5	4.0	4.1
<b>Other members</b>	<b>83.6</b>	<b>83.1</b>	<b>86.4</b>	<b>-0.6</b>	<b>4.0</b>	<b>30.3</b>	<b>30.3</b>
<b>Total</b>	<b>260.3</b>	<b>274.5</b>	<b>285.2</b>	<b>5.5</b>	<b>3.9</b>	<b>100.0</b>	<b>100.0</b>

Source: BP Statistical Bulletin, 2004

## IRAN

### Production and Export of Crude Oil

In the review year, in compliance with the quota set by the OPEC, Iran's average crude oil production amounted to 3.7 mb/d, up by 13 percent. Average daily export of crude oil and oil products increased by 18.6 and 4.8 percent to 2.4 mb/d and 282 thousand b/d, respectively. Total oil export (including crude oil and oil products) rose by 16.9 percent compared to 1381 to 2.7 mb/d. The share of crude oil exports out of the total oil exports was 89.5 percent. Average price of each barrel of crude oil export went up by 3.46 percent to \$ 26.63.

### Geographical Distribution of Crude Oil Exports

In the review year, 58.7 percent of crude oil was exported to Asia, 33.8 percent of which to Asia and Far East and 24.9 percent to Japan, 10.5 percent was exported to Western Europe, 6.6 percent to Africa and 24.2 percent to other areas (including Mediterranean countries). In this respect, the share of export to Asia, Africa and Europe has been reduced, while the share of other areas has increased in this year.

### **Domestic Price of Oil Products**

On the basis of the Budget Law for 1382, price of oil products increased by 10 percent on average this year. Thus, the price of regular gasoline, gas oil, kerosene and fuel oil increased to Rls. 650, 160, 160 and 88.2 per liter, respectively.

### **Domestic Consumption of Oil Products**

In 1382, consumption of four major oil products (gas oil, fuel oil, gasoline and kerosene) averaged 934 thousand barrels per day, up by 6.1 percent compared to 1381. The highest increase in consumption was related to gasoline with 16.5 percent rise, while consumption of fuel oil fell by 4 percent.

### **Production and Consumption of Natural Gas**

Natural gas production (excluding gas injected into oil wells) went up by 14 percent compared to the previous year to 109.6 billion cubic meters. Domestic consumption of natural gas (including household, commercial, industrial, powerplants and refineries consumption) with 13.9 percent rise amounted to 86.6 billion cubic meters. Natural gas flared and regional uses and wastes grew by 26.9 and 46.3 percent to 13.7 and 11.7 billion cubic meters, respectively. Export of natural gas to Turkey amounted to 3.4 billion cubic meters, up by 161.5 percent.

### **Electricity Generation**

Generation of electricity grew by 8.4 percent to 152.9 billion kwh, of which 146.9 billion kwh (96.1 percent) was generated by powerplants affiliated to the Ministry of Energy and 6 billion kwh (3.9 percent) by other companies.

The highest amount of electricity, i.e. 85.4 billion kwh was produced by steam power plants and the least amount, i.e. 0.3 billion kwh by diesel powerplants. The highest production increase, i.e. 37.4 percent rise, was related to hydro powerplants, and the amount of electricity produced by diesel powerplants was reduced by 18.3 percent. Electricity generated by gas and combined cycle powerplants grew by 12.1 percent to 50.2 billion kwh.

### **Electricity Consumption**

In 1382, consumption of electricity increased by 8.6 percent to 114.6 billion kwh. The highest increase in consumption, i.e. 38.8 percent was related to street lighting. Rise in consumption in household, industrial, general, commercial and agriculture sectors was 7.2, 8.1, 10.1, 6.1 and 6 percent, respectively. The highest shares of consumption were related to household and industrial sectors with 33.1 and 32.2 percent share, respectively.