

hydroelectricity.

## 2-2- Oil Sector

- Oil reserves of the world registered in 2001 stood at 1,050 billion barrels out of which 65.3 percent belonged to the Middle East.
- Production of crude oil in this year was 3,584.9 million tons, showing 0.3 percent drop in comparison with its preceding figure.
- Having 78 percent of the world's reserves, the member states of Organization of Petroleum Exporting Countries (OPEC) are producing just 40.7 percent of crude oil.
- In 2001, the world's oil consumption had a 0.2 percent decrease when compared to 2000. Most of it was related to states - with a 1.1 percent reduction of consumption.
- The crude oil refining capacity of the world had a 0.7 growth in 2001 in comparison with its previous year and the crude oil used by the world's refineries showed a 0.9 percent increase.
- With a 16.2 reduction in 2001 in comparison with the year 2000, the average price of OPEC oil basket decreased and each barrel was valued at 23.12 dollars.

## 2-3- Natural Gas Sector

- Comparing with the year 2000, the world's fixed natural gas reserves had a 3.3 percent growth in 2001 reaching 155 trillion cubic meters.
- With 30.7 and 16.7 percent of the world's gas reserves, Russia and Iran have the largest reserves of the world gas respectively.
- Natural gas production edged up 1.7 percent in 2001. The Middle East had the largest share with 6.7 percent

increase.

- In 2001, the world's natural gas trade through pipelines reached 411 billion cubic meters, indicating a 5.7 percent growth in comparison with its previous year.
- In 2001, the world's liquefied natural gas (LNG) trade having a 4.37 percent growth in comparison with the year 2000 reached 143 billion cubic meters. Japan was the No. 1 importer of LNG in the world.
- In the same year, the volumes of gases re-injected, burnt, and wasted natural gas in the OPEC member states equaled 160, 42, and 37 billion cubic meters respectively.

## 2-4- Power Sector

- Gross power generation in the world was 15,684 tera-watts hour in 2001, showing a 1.6 percent growth with its preceding year.
- Power generation in OECD (Organization for Economic Cooperation and Development) countries was 9,160.7 tera-watts hour in 2001 out of which the thermal power plants had a 60.9 percent share, nuclear power plants 24.1 percent, hydroelectric plants 13.8 percent, and renewable energies 1.2 percent.
- In 2001, the volumes of imports, exports, and consumption of power by the OECD states stood at 333.8, 324.9, and 9,169.6 tera-watts hour respectively.
- In the same year, 442 nuclear power plants were operational with a total gross output of 6.02 Giga watts.

## 2-5- Coal Sector

- The United States, Russia, China, India, and Australia have the largest coal reserves in the world with 25.4,

15.9, 11.6, 8.6, and 8.3 percent of the world's deposits respectively.

- In 2001, production of coal reached 2,248.2 million tons of oil equivalents having a 5.4 growth in comparison with the year 2000.
- Despite their little share of coal reserves, the South and Central American countries increased their coal production and consumption by 8.9 percent in 2001.
- As the second largest coal consumer of the world, China decreased its demand by 5.4 percent.
- The United States and China had the highest rate of coal consumption in comparison with other countries of the world, having 24.6 and 23.1 percent of the total coal consumption in the world.
- The CIF prices of imports of heating coals and coke by the OECD states in 2001 were 39.9 and 39.6 dollars per ton.

## 2-6- Renewable Energies Sector

- Production of hydroelectric power had a 3.7 percent decrease in 2001 when compared with its previous year. The Middle Eastern countries and OECD states had the highest rate of decrease in power generation with 20.5 and 7.1 percent respectively.
- The capacity of wind farm energy increased by 6,477 megawatts in the world by the end of 2001, reaching 24,927 megawatts.
- In early 2001, the total capacity of geothermal power plants was 7,974 megawatts and the generated power equaled to 49,262 GWH.
- The total capacity of photo-voltaic generators installed in different countries in 2001 was equivalent to 982 megawatts. ■

- In this year, the length of pipelines established for transfer of natural gas was 1,300 km and the grid equaled 10,753 km.
- Domestic consumption of natural gas stood at 69 billion cubic meters out of which 32.6 percent was consumed by household-commercial and public sectors, 13.9 percent by the industrial sector, 36.1 percent by power plants, 4.3 percent by refineries, 8.8 percent by the petrochemical sector, 4.2 percent by the transportation sector, acid gases, and discharge.
- Following the replacement of natural gas in urban and rural household sectors, the consumption of natural gas in the household, trade, and public sectors has had 9.3 percent growth on average in 1375-80 reaching 22.6 billion cubic meters from 14.5 billion cubic meters.

#### 1-4- Power Sector

- The nominal capacity and generation of power by the Ministry of Energy have had 6.6 and 7.4 percent growth respectively when compared with the preceding year increasing to 28,032 megawatts and 124,725 million KWH.
- The volume of electrical energy exchange between Iran and its neighboring states has reduced from 722 million KWH in 1379 to 305 million KWH in 1380.
- The thermal output of the power plants of Ministry of Energy stood at 35.6 percent in 2001.
- The loading coefficient of the country was 64.9 percent in 1380, having one percent growth in one year.
- The total power consumption in the country in the year 1380 was 97,171 million KWH out of which 33.9 percent was consumed by the household sector, 18.9 percent by commercial and public sectors, 31.4 percent by the industrial sector, 11.4 percent by the agricultural sector, 0.2 percent by the transportation sector, and 4.2 percent by other sectors.
- Power consumption of the agricultural sector had a 21.1 percent growth in comparison with the previous year. The increase was due to electrifying the water well pumps by Ministry of Energy.
- The total power consumption in the transportation sector stood at 188.8 million KWH in 1380 out of which 14.7 percent was consumed by tramcars and 85.3 percent by metro.

#### 1-5- Solid fuels

- The coal reserves that have been under, introductory, comprehensive, and complementary studies equal 5,367 million tons and the accessible reserves are estimated at 419.4 million tons.
- Out of 101 operational mines of the country, 31 are exploited by the state sector and 70 by the private sector.
- Of 1,764.9 thousand tons of coal found in 1380, 1,522.3 thousand tons were coke and 242.6 thousand tons were heating coal.
- In the same year, the illegal exploitation of coal and firewood - seized by officials - stood at 118.7 tons and 9.6 thousand cubic meters respectively.

#### 1-6- Renewable Energies

- In 1380, the total ready-to-use capacity of hydroelectric power plants of Ministry of Energy was 1,998.5 megawatts and the capacity of small of Ministry of Agricultural Jihad ones stood at 7.7 megawatts.

- The small water-run power plants' potential of the country was 1,417.7 megawatts in 2001 out of which 2.6 megawatts belonged to micro water-operated power plants, 334.8 megawatts to mini water-run power plants, and 1,180.3 megawatts to small water-operated power plants.
- In 2001, the exploitation capacity and power generation by 28 generators in three wind farms in Roudbar, Manjil, and Herzevil stood at 10.8 MW and 33.6 GWH respectively.

#### 1-7- Environmental Sector

- Using fossil fuels, the transportation had the lion's share in polluting the environment in 1380 so that 60.2 percent NOx, 22 percent SO2, 25 percent CO2, 98.3 percent CO, 95 percent CH, and 75 percent SPM have been released in the air.
- Due to compounds of fuels consumed for power generation, this sector has produced 39.3 percent of the total discharged SO2 and 33.6 percent of that of SO3 in this year.
- For each KWH power generated by the country's power plants in 1380, 166.2 grams of carbon, 2.8 grams of SO2, and 0.9 grams of Nox have been released.

## 2- Changes in World's Energy in 2001

### 2-1- Energy Sources & Consumption in World

- In 2001, the total initial consumption of energy in the world amounted to 9,124.8 million tons of crude oil equivalent out of which 38.5 percent was oil 23.7 percent natural gas, 24.7 percent coal, 6.6 percent nuclear energy and the remaining



# Iran's Energy Balance Sheet in 2001-2002 (1380)

Here below comes the energy balancesheet of Iran in 1380 (March 21, 2001 - March 20, 2002) based on the latest data:

## 1- Performance of Energy Sector in Iran

### 1-1- Energy Sources & Consumption in Iran

- In 1380, the total consumption of energy in Iran stood at 1,699.5 million barrels of crude oil equivalent out of which 75 percent was crude oil, 24 percent natural gas, 0.5 percent hydroelectric Power, and 0.5 percent other solid and non-commercial fuels, renewable energies.
- Energy consumption reached 661.7 million barrels of crude oil equivalent, showing a 1.7 percent growth in comparison with its preceding year.
- In industrial and agricultural sectors, energy consumption in 1380 has had 3.8 and 1.1 percent reduction when compared with its previous year while it has increased 2.4, 6, 6.5, and 9.9 percent in household and commercial sector, transportation, power plants, and refineries respectively.
- Intensity of energy had a 0.9 percent decrease when compared with the year 1379.

### 1-2- Oil Sector

- Primary and secondary reserves of the country's liquid hydrocarbons was

estimated at 154.41 billion barrels in 1380. Out of this figure, 78.2 percent of the in place reserves was in the onshore fields and the remaining 21.8 percent belonged to offshore areas.

- Following exploration operations in 1377-80, the discovered oil in place amounted to some 50 billion barrels.

- Consumption of main oil products having a 3.6 percent growth has increased to 70.2 billion liters in 1380 (March 21/2001- March 20/2002) from 67.8 billion liters in 1379. In this year, the major part of oil products consumption belonged to gas oil and petrol and least share went to liquefied gas.

- Consumption of petrol in transportation sector in 1380 had a 7.9 percent growth in comparison with its preceding year. Tehran Province had the highest share of petrol consumption with 24 percent while the lowest consumption went to Ilam Province with 0.5 percent.

- Due to easy access to different types of energy including natural gas and electricity, consumption of kerosene decreased by 2.3 percent and it was reduced to a billion liters in 1380 from 9.2 billion liters in 1379.

- In 1380, consumption of gas oil had a 2.3 percent growth soaring to 25 billion liters and the transportation sector having a 50 percent share in consumption of this type of fuel was the biggest consumer in comparison

with other economy sectors. Gradual replacement of gas oil with natural gas in household sector has helped reduce its consumption by 6.6 percent.

- Following the hike in consumption of liquefied gas by vehicles, its use had a 12.1 percent growth in transportation sector in 1380 in one year..

### 1-3- Natural Gas Sector

- The country's recoverable gas reserves amounted to 26.5 trillion cubic meters by the end of 1380 (March 20, 2002) out of which 52 percent was deposited in the offshore areas and the remaining on onshore fields.

- In 1376-80, the exploration operations have led to discovery of 1.74 trillion cubic meters of natural gas in place and 2.5 barrels of gas liquids in place.

- During this year, 312 million cubic meters of rich gas, 257 million cubic meters of light gas, and 12,523 cubic meters of gas condensates have been produced per day.

- Having a 9.3 percent growth in 1380 in comparison with the year 1379, the domestic natural gas output reached 67 billion cubic meters.

- In the same year, the imports of natural gas from Turkmenistan equaled 4.5 billion cubic meters and the exports of gas to Turkey stood at 357 million cubic meters.

- In 1380, 75.4 million cubic meters of gas per day were injected to the gas fields to preserve the oil fields, increase or maintain the production output, and prevent the reduction of pressure level in the oil fields.

- Compared to its preceding year, the refining capacity of the country's gas refineries due to exploitation of the second phase of Khangiran Refinery had a 8.8 percent growth in 1380.