

**REPORT OF THE  
SECOND D-8 WORKING GROUP MEETING ON ENERGY  
HELD AT TEHRAN, I.R. of IRAN  
30 - 31 January 2005**

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## **EXECUTIVE SUMMARY**

### **1.1. Introduction**

Second D-8 Working Group Meeting on Energy was held on January 30-31, 2005 at Tehran, I.R. of Iran. The meeting was coordinated by Ministry of Energy in liaison with Ministry of Foreign Affairs. The following countries participated at the meeting, namely Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan and Turkey.

### **1.2. Opening Ceremony**

Eleven experts from six of the eight member countries and some 15 dignitaries from I.R. of Iran attended the meeting. The opening ceremony was commenced with recitation from holy Quran. His Excellencies Dr. Amrollahi, Vice Minister of Energy, I.R. of Iran and Mr. Majedi, Deputy Minister of Foreign Affairs and Commissioner of D-8 and other Directors General from both Ministry of Energy and Ministry of Foreign Affairs attended the opening ceremony. Chaired by Dr. D. Manzoor, Ministry of Energy, I.R. of Iran, H.E. Dr. Amrollahi gave the opening address.

After opening address by H.E. Dr. Amrollahi, the report of the First Energy Experts Working Group Meeting held at Abuja, Nigeria on April 3-5, 2001 was presented by the Nigerian delegate Professor A.S. Sambo, Director General, Energy Commission of Nigeria. Then the agenda of the meeting was read by the chairman and adopted by the D-8 delegates and also the Draft Committee and Reporters of the meeting were elected by the delegates.

### **1.3. Country Reports**

During the meeting, country reports were presented by delegates from member countries including Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan and Turkey. Only Bangladesh didn't present any report.

### **1.4. Technical Sessions**

Two technical sessions were held on how to enhance exchange of energy information and also on how to set up an "International Institute for Training and Research" for development of human resources.

## **1.5. Meeting Statement**

At the end of the meeting, a brief report of the meeting was prepared by draft committee and along with the proposed decisions and recommendations was read by chairman and adopted by delegates.

## **2- OPENING CEREMONY**

In addition to eleven experts from seven of the eight member countries, representatives from the embassies of D-8 member countries in Tehran and the other dignitaries from Ministry of Energy, Ministry of Foreign Affairs and Ministry of Petroleum attended the Opening Ceremony. Chaired by Dr. Davood Manzor, Ministry of Energy of I.R. of Iran, the opening ceremony started with recitation from the Holy Quran and thereafter His Excellency Dr. Amrollahi, Vice Minister of Energy of the Islamic Republic of Iran gave the opening address.

Addressing the importance of energy as one of the most important drivers for modern economic development, Dr. Amrollahi noted that the challenge for us as policy makers is to provide for increase in demand while at the same time ensuring that it is economically and ecologically sustainable.

He emphasized that the challenge before Iran is to meet the energy needs of all segments of the population in an efficient and affordable manner ensuring long-term sustainability and environmental protection and in this regard, energy efficiency and conservation should be integral to any energy strategy.

Regarding to energy situation and the country's potentials, he mentioned that enhanced research and development and the transfer of energy-related technologies between and among countries is essential, and can be implemented through strategic partnerships, joint pilot projects and training. He emphasized that there are significant opportunities for D8 countries to work together to improve the analytical and policy-making capacity of the member countries. He noted that activities, such as information exchange and experience sharing, that can help promote the adoption of good practices and initiatives should get more attention.

### **2-1- Report of the First Meeting in Nigeria**

After opening address by H.E. Dr. Amrollahi, the report of the First Energy Experts Working Group Meeting held at Abuja, Nigeria on April 3-5, 2001 was presented by the Nigerian delegate

Professor A.S. Sambo, Director General, Energy Commission of Nigeria. In the first Meeting, Eleven experts from seven of the eight member countries attended the meeting. Country papers were presented by each participating country on the energy situation and development in their respective countries and the presentations were actively discussed.

In the Energy Experts Meeting, the energy policy of the member countries for the purpose of establishing cross-linkages was examined. It also agreed on the following objectives for the activities of the Energy Sub-group:

- To cooperate on the development of energy data bank, information exchange and networking
- To promote bilateral and multilateral energy trade
- To promote cooperation in research and development, and human resource development in the energy sector
- To place special focus on increasing access to energy for rural areas using both commercial and non-commercial energy
- To cooperate in the promotion of manufacturing activities in the energy sector
- To promote commercial activities in energy products and services
- To promote environmentally sound and energy efficient policies and practices

In the field of Project Identification, the following projects were agreed upon after much deliberation:

- Promotion of small and mini hydro power plant projects
- Cooperation in improving production, transmission, distribution and utilization of energy technologies
- Cooperation in the establishment of a central and country based data banks
- Cooperation in the utilization of energy products and services which exist in member states
- The following modalities for implementation of the projects were adopted as applicable:
  - Feasibility study phase
  - Design phase
  - Manufacturing phase
  - Installation phase
  - Operation and maintenance phase

- Monitoring and evaluation phase
- It was recommended for the consideration of the D-8 Council of Ministers that:
- The D-8 energy programs should be funded with grants from multilateral banks provided the conditions be suitable
- Efforts be made to establish a D-8 Bank

After presenting the First Energy Working Group Meeting Report by Nigerian delegate, the agenda of the second meeting was read by the chairman and adopted by the D-8 delegates. It was decided that during the meeting, country reports to be presented by delegates and also two technical sessions on how to enhance exchange of energy information and also on how to set up an “International Institute for Training and Research” for development of human resources to be held. Also the Draft Committee and Reporters of the meeting were elected by the delegates.

### **3- COUNTRY REPORTS**

#### **3-1- EGYPT**

##### **3-1-1- Overview of Oil and Gas industry**

Egypt is one of the world pioneers to start oil activities. First discovery of crude oil in Egypt in recent history was in 1868. The first oil well drilled in Egypt in 1886, and the first commercial production started in 1909.

Morgan Field, the first major oil field in Egypt, was discovered by Amoco in 1963. The first gas field “Abu-Madi” was developed in 1975.

Natural Gas was only a by product of oil of no great value. With wider prospects for gasprone areas, increased exploration for gas in its own right became a necessity. This was reflected in continuous update of production sharing model. As a result, more oil and gas reserves were discovered and restructuring of the oil sector became essential to focus more on gas and emerging activities.

Local oil consumption in a period between 1983/84 –2003/04 has increased from 17.1 M tons to 23.1 M tons and for gas this increase was from 19.8 to 46.1 M tons.

Export is the cornerstone of Egypt strategy and during the fiscal year 2002/2003, exports revenues increased to 3.4 billion US\$ reaching its highest levels ever. Yet, this year, a further

increase to 4 billion US\$ is expected.

Natural gas production has increased from 1.1 BSCF/D in 1993-4 to 3.1 BSCF/D in 2003-04. Natural gas consumption by sector in 2004 is as bellow:

- Power Generation 62%
- Industry 9%
- Fertilizers 11%
- Petroleum Sector 10%
- Cement & Ceramic 5%
- Domestic & CNG 3%

### **3-1-2- Egyptian Gas Export Projects**

The Egyptian petroleum sector is simultaneously implementing three major gas export projects namely Damietta LNG, Idku LNG and Arab Gas Pipeline. The Egyptian petroleum sector is setting a precedent for LNG projects execution (6 years from Discovery to Export).

Main features of Egypt petrochemicals master plan are:

- Comprises 14 Complexes (24 Projects, 50 Production Units).
- 10 \$ Billion Investments (MOD) to Be Realized During 20 Years.
- Create over 100 Thousand Jobs (Direct-indirect).
- Produce 15 Million Tons of Products, Worth 7 \$ Billion.
- Displace Imports and Generate Export Sales Over \$ 4 billion per year.
- 

### **3-2- INDONESIA**

National energy reserves of Indonesia in 2003 include:

- Oil 86.9 billion bbl
- Natural Gas 385 Tscf
- Coal 50 billion Ton

Of these reserves 5 billion bbl oil, 90 Tscf gas and 5 billion tons of coal are proven reserves respectively.

Having a high potential for producing power in the years coming, the current installed capacity of power in the country is:

- Hydropower 4200 MW

- Geothermal 807 MW
- Mini/Microhydro 84 MW
- Biomass 445 MW
- Solar Energy 8 MW
- Wind Energy 0.6 MW

Due to rapid economic growth, the growth of primary energy demand in 1970-2003 was + 8.5 % per year and the role of oil is still dominating. The share of final energy consumption in different sectors includes 38.5% for industry, 23.5% for household and commercial and 38% for Transportation. The electrification ratio of the country in 2003 was around 53% .

Indonesian Strategies on Energy Development include:

- Reform in energy sector
- Market mechanism
- Empowerment of region in energy development
- Development of integrated energy infrastructure
- Increase energy efficiency (DSM and SSM)
- Encourage role of national energy industry
- Increase business of national energy industry
- Empowerment of people/partnership

### **3-2-1-Renewable Energy Strategies**

In the field of Renewable Energy, the country target in 2020 is that at least 5% of the total power capacity should be based on renewable energy.

Policies related to New Renewable Energy and Energy Conservation includes:

- National Energy Policy(Ministerial Decree:No.0983 K/16/MEM/2004)
- Green Energy Policy(Ministerial Decree: No. 0002/2004)
- Small Power Generation using Renewable Energy(PSK Tersebar) (Ministerial Decree: No. 0002/2004)
- Geothermal Law(Law No. 27/2003)
- Regulation on Electricity Supply and Utilization (Presidential Decree No. 03/2005)

### **3-2-2- Energy Information System**

The Centre for Energy Information works on preparing the Energy Balance of the country and collecting Data on energy supply and demand, export-import, energy transformation, energy reserves and production.

Energy related research institutes in Indonesia are as bellow:

- Energy Research and Development Centre – Ministry of Energy and Mineral Resources
- Agency for the Assessment and Application of Technology
- Indonesia Institute of Science
- The Agency of Aerospace and Aeronautics
- The National Nuclear Energy Agency
- Universities

### **3-2-3-Possible Fields on Energy Cooperation under D-8**

- Exchange of energy information (Technology, expertise)
- Joint Implementation for Pilot Projects
- Utilize existing energy training facilities

## **3-3- MALAYSIA**

### **3-3-1-Malaysian Energy Policy**

The Malaysian energy policy comprises of the following policies:

*i. National Petroleum Policy (1975)*

The objectives of the National Petroleum Policy are:

- Optimizing the use of petroleum resources by providing adequate supplies at reasonable price
- Enhancing the investment climate and providing opportunities for energy intensive industries
- Enhancing revenue and export earnings through oil and gas exports
- Ensuring adequate local representation in ownership and management throughout the whole petroleum operation value chain
- Encouraging conservation of petroleum resources and environment protection.



### *ii. National Energy Policy (1979)*

The national energy policy can be broadly defined in terms of three policy objectives:

- Supply Objective
- Utilization Objective
- Environment Objective

### *iii. National Depletion Policy (1980)*

The National Depletion Policy was formulated to prolong the life of oil and gas reserves. The total production of crude oil is currently limited to about 600,000 barrels per day. At the current production rate, proven oil reserves are expected to last another 16 years.

As for gas, at the current rate of production, the supply of natural gas can be sustained up to the year 2020.

### *iv. The Four Fuel/Diversification Policy (1981)*

The Four-Fuel Policy which, while complementing the National Depletion Policy, aimed at diversifying fuel mix in order to ensure reliability and security of supply. This strategy was designed to reduce the country's over-dependence on oil as the energy source and aimed for an optimum mix of oil, gas, hydro and coal in the supply of electricity.

### *v. Fifth Fuel Policy (2001).*

The policy was formulated under the Eighth Malaysia Plan (Year 2000-2005) to encourage the utilization of renewable resources such as Biomass, Solar, Mini Hydro, etc as an additional source of electricity generation. By 2005, renewable energy is expected to contribute to approximately 5% of the grid-connected production of electricity.

## **3-3-2- Malaysian Electricity Industry**

The Generation stage of the electricity sector has already been deregulated /privatized since 1992 with the introduction of independent power producers (IPPs).

Competition has helped to reap further efficiency gains and relieve the financial burden of the Government. At the moment, there are 19 IPPs in operation and they contribute to about 60 % of the grid-connected electricity output while the balance is contributed by the utilities i.e. Tenaga Nasional Berhad, Sabah Electricity Sdn.Bhd. and Sarawak Electricity Supply Corporation. Electricity generation has increased from 22,768 GWh in 1990 to 69,371 GWh in 2000 and this figure will exceed 102,340 GWh in 2005.

Malaysia Electricity Supply Industry Trust Account (MESITA) is a trust fund which was formally established on 1 January 1997. Under MESITA all Independent Power Producers (IPPs) are required to fulfill their national obligation towards the development of electricity supply industry in the country. RM442.8 million has been contributed by the IPPs since 1997. From this amount RM207.9 million has been spent to carry out projects.

### **3-3-3- Renewable Energy & Energy Efficiency**

Fossil fuels and mainly oil and gas are the main sources of electricity generation and the use of coal and hydro is increasing. Government has emphasized on energy efficiency and energy efficiency regulation has been in place and some Energy Efficiency Initiatives have been adopted.

Promotion of Renewable Energy (RE) has been emphasized through introducing Small Renewable Energy Power Program (SREP). Currently 59 projects have been approved, amounting to 314.1 MWe connected to grid.

### **3-3-4- Oil and Gas Industry**

#### **3-3-4-1- International operations:**

1. Upstream & downstream - 35 countries over the world
2. Malaysia-Thailand Joint Development Authority (MTJDA)
3. Trans-Thailand-Malaysia Gas Pipeline System

#### **3-3-4-2- Upstream activities:**

1. Exploration, development and production of crude oil and natural gas both at home and abroad
2. Currently PETRONAS has 51 producing oil fields and several others under development.
3. Currently production about 750,200 barrels of oil per day
4. 5 billion cubic feet of gas per day
5. As at January 2004, Malaysia has about 4.84 billion barrels of crude oil reserves and 87.0 trillion standard cubic feet of gas reserves.
6. International reserves of about 6.29 billion barrels of oil equivalent including MTDJA project

### **3-3-4-3- Downstream activities**

1. Oil Business (Refining Activities) – abroad and at home
2. Oil Business (Marketing Activities) – abroad and at home
3. Gas Business
4. Petrochemical Business
5. Logistic and Maritime Business

### **3-3-5- REGIONAL ENERGY COOPERATION**

- 1- Malaysia-Thailand Joint Development Authority (MTJDA)
- 2- Trans-Thailand-Malaysia Gas Pipeline System
- 3- Trans ASEAN Gas Pipeline Project (TAGP)
- 4- ASEAN Power Grid Network

## **3-4- NIGERIA**

Energy is the mainstay of Nigeria's economic growth and development. It plays a significant role in the Nigerian international diplomacy. It serves as

- Tradable commodity for the earning of national income (over 70% of Nigeria's federal revenue) for government developmental programmes
- Input into the production of goods and services in the nation's industry, transport, agriculture, health and education sectors
- Instrument for politics, security and diplomacy
- Energy, especially crude oil, has over the past five years contributed an average of 13.5% to Nigeria's GDP, the highest contributor after crop production.

### **3-4-1-The Structure of the Energy Sector Governance**

In Nigeria, four Federal Ministries have policy and planning responsibilities on energy matters.

The Energy Commission of Nigeria (ECN) was established as the apex organ responsible for planning and coordination of national policies in the field of energy in all its ramifications. In coordinating energy policies, ECN has put in place a national energy policy, approved by

Government.

The exploitation of the country's oil reserves is handled mainly by six major multi-national companies in Joint Venture (JV) with the NNPC including Shell, ELF, Texaco, Mobil, Agip and Chevron. In addition to JV, production sharing contract (PSC) arrangement is also now being used with regards to the upstream oil operations, and in particular, the deep off shore operations. JVs control up to 90% of the total exploration and production activities in the country. Some indigenous Nigerian enterprises are also engaged in the upstream oil activities. These include Alfred James Petroleum Ltd, AMNI Int. Petroleum Development Co. Ltd; Summit Oil Int. Ltd, and Yinka Folawiyo Petroleum.

Natural gas is managed by the Nigerian Gas Company (NGC) which owns Approximately 1,100 km of various diameters of gas pipeline with transmission capacity of about 1,800 MMSCF/day of gas. Nigerian Liquefied Natural Gas (NLNG) has facilities for the liquefaction and export of liquid natural gas with a capacity of 5.78 million tons per annum of LNG. Also there are four refineries managed as subsidiaries of the NNPC, with a total installed capacity of 445,000 barrels/day (bpd). In addition there are nine strategic LPG storage depots, 90 LPG filling stations, eight major petroleum products marketers and 800 independent petroleum marketers.

### **3-4-2-Power Sector**

The generation, distribution and marketing of electricity in the country was vested in the National Electric Power Authority (NEPA). Existing infrastructure include:

- 9 generation stations (3 hydro-based and 6 thermal stations)
- Total generation capacity is about 6,000MW, solely owned by NEPA
- Recently, independent power producers (IPP) have installed a 278MW station in Lagos while a 30MW emergency power plant is in Abuja.
- By 1995, there were 6,000 km of 330KV and 500km of 132KV transmission gridlines and 17,80Km of 33/11KV lines,
- Twenty two 330/132KV, ninety one 132/33KV and five hundred sixty three 33/11KV substations.
- By the year 2000, there were over 35,743Km of 33KV and over 26,498Km of 11KV distribution lines. Distribution underground cables were 1.430Km in length for 33KV and 2,558km for 11KV.

There are four existing coal mines namely Opara and Onyeama underground mines in Enugu State, Owukpa Underground mine in Benue State and Okaba surface mine in Kogi State of which Only the Okpara and Okaba mines are presently producing.

An overview of the Nigerian energy balance shows that:

- Crude oil reserve at 31 billion barrels in 2002, production is 2.3m barrels per day mostly exported.
- Natural gas reserve at 4293 billion m<sup>3</sup> in 2002, production 44.62billion m<sup>3</sup> made up of 53% associated gas and 47% non-associated gas
- Coal and lignite reserves are estimated at 2.75 billion tonnes
- Tar sands at 31 billion barrels of oil equivalent
- Large-scale hydropower at 10,000MW
- Estimate for uranium ores is ongoing
- Estimated daily domestic demand is 300,000 barrels
- Sales to the domestic market and export by the NGC were 15.78 billion m<sup>3</sup> and 8.63 billion m<sup>3</sup> respectively
- NEPA's installed generation capacity is about 6,000MW
- Power is accessible to 40% of Nigeria's population, for an average period of six hours per day

Nigeria suffered continued crisis in the supply of petroleum products and electricity despite the huge national resources expended. With restructuring and privatization, government will concentrate these huge resources on its core functions and responsibilities of providing basic infrastructure and key services like education, health and environmental protection, while regulating and enforcing the "rules of the game" so that the market can work efficiently, with provision of adequate security.

### **3-4-3- Renewable Energy**

ECN is the primary government agency for the development and promotion of Renewable Energy Technologies in the country. ECN has established under it four Energy Research Centers; two of these focus on renewable energy issues and development. Other agencies and NGOs also have significant renewable energy components in their programs.

The key elements in the national policy on the development and application of renewable

energy and its technologies are as follow:

- To develop, promote and harness the Renewable Energy (RE) resources of the country and incorporate all viable ones into the national energy mix.
- To promote decentralized energy supply, especially in rural areas, based on RE resources
- To de-emphasize and discourage the use of wood as fuel
- To promote efficient methods in the use of biomass energy resources
- To keep abreast of international developments in RE technologies and applications

### **3-4-4-Energy Efficiency and Conservation**

Improving energy management and conservation in all the sectors of the national economy has been of great concern. About 67% of the total electricity demand by manufacturing sector is met by self-generation. Measures for achieving efficiency improvements in the utilization of energy in industries put in place by the ECN include:

- Energy conservation activities such as energy audits, retrofitting, efficient technologies for energy efficiency in buildings and industries.
- A National Energy Efficiency Program is being implemented with the support of UNIDO.
- ECN with the assistance of UNIDO has developed a blue print for the establishment of an Energy Conservation Agency.
- Awareness Creation and Sensitisation
- Capacity Building in Energy Audit and Energy use Survey
- Walk-Through Energy Audits

### **3-4-5- Energy Cooperation among D-8 Member Countries**

- 3-4-5-1-Cooperation and Networking
- Opportunities for energy networks and energy trade between the countries with surplus and those with deficit.
- Nigeria for instance has been exporting power to Niger Republic.
- Natural gas from Nigeria to Ghana, Togo, and Benin Republic via the West African Gas Pipeline Project, with possible extension to Ivory Coast and Senegal.
- The philosophy of energy pooling and networking has advantages ranging from economies of scale to energy economy conservation

- These advantages can be enhanced through cooperation, and the political will, amongst nations. The Government of Nigeria has put in place a Ministry for Cooperation and Integration in Africa, in addition to the Ministry of External Affairs, to facilitate such cooperation.

### **3-4-5-2-Investment in RE Technologies**

- Nigeria Energy strategy for 2010 envisages a modest target of 5 – 10% for RET of the power generation requirements of 10,000.00 MW.
- SHP potential for Nigeria is about 732 MW, of which only 19MW has been developed.
- Member countries could cooperate in planning and implementing investment programs to develop viable RETs
- Nigeria has eight High Priority National Projects aimed at promoting market penetration of RE
- It is Nigeria hope that through the information provided in meeting, the D-8 member States appreciate Nigeria's energy sector, its problems and prospects, and also assist the D8 in making positive investment decisions in the country's energy sector.

### **3-5- PAKISTAN**

Total energy supplies of Pakistan in 2003-04 was 49.8 Million TOE of which Oil & Gas accounts for about 81.1% .

Total installed electricity capacity of hydel, thermal and nuclear power plants is 17,793 MW and total generation of power plants is 75,682 GWh.

Discovered oil and gas reserves of the country are 801 Million Barrels and 45.3 Trillion Cubic Feet (Tcf) respectively. Annual production of oil is 22.6 Mb and the annual production of gas is 1.2 Tcf.

Total crude oil and petroleum products of Pakistan in 2003-04 were 13.01 MMT with a total cost of U.S\$ 3.12 billion. Sector-wise oil consumption in 2003-04 was 13.4 million tons/year and for gas this figure was 1050 Billion Cu.Ft/ year.

Total energy demand increased from 35.1 Million TOE in 1994 to 49.8 MTOE in 2004 and it is projected to reach 94.4 MTOE in 2014.

Indigenous Energy Supply Scenario Assumptions for Pakistan can be summarized as follow:

- Oil: from 64,000 Barrel Per Day (BPD) in 2004 to 100,000 BPD in 2014
- Gas: from 3.6 BCFD in 2004 to 4 BCFD in 2014
- Coal: from 4.3 MMT in 2004 to 15 MMT in 2014
- Hydel: from 6,500 MW in 2004 to 9000 in 2014
- Nuclear: from 462 MW in 2004 to 787 MW in 2014
- Renewables: from 0 MW in 2004 to 100 MW in 2014
- Total energy produced (MTOE): from 36.5 in 2004 to 51.9 in 2014

But there is a gap between projections from indigenous energy supply and demand. To overcome this gap, one scenario is to import the needed amount of oil, gas and coal from external sources. The amount of oil, gas and coal import is projected to be 20, 19 and 3 MTOE.

To meet energy deficit of the country, the following policies have to be considered:

- Explore and exploit indigenous fossil fuels.
- Add new hydro and nuclear power.
- Optimize economic inter-fuel substitution.
- Promote energy conservation and efficiency.
- Develop renewable energy resources.

### **3-6-TURKEY**

Total primary energy supply (TPES) in Turkey reached to 83.7 Mtoe, up by 58% from the 1990 level growing in phase with GDP. Dependence on oil has declined from 51.3% in 1973 to 37.9% in 2003.

Natural gas demand grown by almost 7-fold since 1990 gaining a 23.2% share in TPES. The share of coal in TPES is 26.9%, down from 32% in 1990 and the share of combustible renewables and wastes 6.9%, down from 13.6% in 1990. Hydropower production depends on weather making annual variations large but the longer term trend has been increasing supply due to new capacities. Production of geothermal energy has almost doubled since 1990 reaching 0.86 Mtoe. Solar and wind contributed 0.36 Mtoe (0.4% of the TPES) in 2003.

Domestic energy production was 23.8 Mtoe, accounting for 28.4% of TPES in 2003. The domestic energy sources are coal (10.8 Mtoe in 2003), renewables (10 Mtoe), oil (2.5 Mtoe) and



gas (0.5 Mtoe). The government forecasts both oil and gas production to decline due to depletion of resources but coal production (principally lignite) and renewable energy production to increase. The share of imports in TPES has increased significantly, from 51% in 1990 to 72% in 2003. The importation of coal and its products was 12.1 Mtoe (18.6% total imports), crude oil and oil products was 34 Mtoe (52.2%), natural gas was 18.9 Mtoe (29.1%) and electricity was 0.1 Mtoe (0.2%). Net energy imports increased by 6.0% on the average per year between 1990 and 2003, and reached to 60.5 Mtoe in 2003.

### **3-6-1- Policy Objectives and Major Developments**

The main objective of the energy policy of Turkey is to ensure sufficient, reliable and economic energy supplies in order to support economic and social development. In parallel to this objective, Turkish energy policy is concentrated on the following pillars:

- Prioritizing energy security activities to cope with the increasing demand and import dependency
- Reforming and liberalizing the energy sector to increase productivity and efficiency and to enhance transparency
- Taking into account the environmental concerns in all stages of the energy chain within the framework of sustainable development
- Intensifying R&D on energy technologies.
- Facilitating projects for the transportation of hydrocarbons from the East to Western Europe in the context of the “East-West Energy Corridor” concept

Turkey is actively taking place in initiatives to establish regional markets, such as the Energy Community of South East Europe and Med-Ring Project. These initiatives are expected to increase cross-border electricity and gas trading.

The opening of the Turkish electricity and gas markets are perceived to be an integral part of a competitive energy market creation process. At present the market opening rates of 29% for the electricity market and 80% for the gas market have been achieved in this respect and 100% market

opening rates for both sectors are targeted through gradual decreases in eligibility thresholds.

### **3-6-2- Renewable Energy**

Turkey has substantial renewable energy resources. Renewables are making the second largest contribution to domestic energy production after coal. In 2003, energy from renewable sources amounted to 10 Mtoe (12% of the TPES). Two thirds of renewables used in Turkey are composed of combustible renewables and waste and the rest being mainly hydro and geothermal. Electricity generation from renewables totalled 35.5 TWh and contributed 25% to total generation in 2003. Hydro is the dominating source of renewable electricity as only 0.15 TWh came from other sources. Hydropower generation climbed from 2 Mtoe (23.1 TWh) in 1990 to 3.0 Mtoe (35.3 TWh) in 2003 growing on average by 3.8% per year. The contribution of geothermal to TPES was 0.86 Mtoe in 2003, including 89 GWh of electricity generation. At present, total installed wind power capacity is 20.1 MW.

The government estimates renewable energy supply to increase from 10 Mtoe in 2003 to 12.2 Mtoe by 2010 and 19.7 Mtoe by 2020. Electricity generation from renewables is expected to increase from 35.5 TWh in 2003 to 62.3 TWh in 2010 and 118.3 TWh in 2020. Use of renewables for heat production is estimated to grow from 6.9 Mtoe in 2003 to 6.6 Mtoe in 2010 and 9.3 Mtoe in 2020.

### **3-6-3- Optimizing Energy Consumption & Energy Efficiency**

Total final consumption of energy (TFC) was 64 Mtoe in 2003, up by 54% from the 1990 level. In 2003, oil accounted for 41.3% of TFC, electricity 14.6%, coal 21%, combustible renewables and wastes 9%, natural gas 12.4%, geothermal 1.2% and solar and wind 0.5%. The share of oil and the combustible renewables and wastes (largely non-commercial energies) has declined since 1990 whereas use of gas, electricity and, to some extent coal, have increased. The industry (including non-energy use of 2 Mtoe) was the largest energy-consuming sector (45%), followed by residential, services and agricultural sectors (35%) and transport (19%). Turkey attaches great importance to the utilization of the potential of energy efficiency in meeting its goal of satisfying demand while not hampering economic growth and while protecting the environment. The government's studies have demonstrated that Turkey has 25-30% energy conservation potential.

Up to day, various projects have been carried out by donation of international organizations such as UNIDO, World Bank, JICA and EU. In the scope of these projects approximately 100

energy audit studies have been carried out at different industrial plants and more than 700 energy managers from industry have been trained at the Energy Manager Courses organized by EIE/NECC. Three international Energy Manager Courses have also been held since 2002 in cooperation with ESCAP and JICA. Additionally, promotion, awareness and legislation studies have been conducted by EIE/NECC. EIE/NECC's budget for energy efficiency activities was approximately 600,000 US\$. These activities include:

- Training consumers on energy conservation measures and raising consumers' awareness on energy efficiency
- Preparing energy efficiency publications for all sectors
- Conducting energy audits in industry
- Consultation process with the industrial and building sectors in formulation of energy efficiency measures
- Maintaining energy manager database and energy consumption statistics for industrial sector and public buildings
- Coordination of the dialogue and cooperation with the related governmental institutions, private sectors, universities, research institutes and manufacturing associations within the Energy Conservation Coordination Board

### **3-6-4-International Pipeline Projects**

Due to special Geopolitics position of Turkey, several international pipeline projects have been constructed or are under construction in the country. Of these projects, the following is of important consideration:

- Baku-Tbilisi-Ceyhan Crude Oil Pipeline Project
- Interconnector Turkey-Greece
- Turkey-Bulgaria-Romania-Hungary-Austria (Nabucco) Natural Gas Pipeline Project

## **3-7- ISLAMIC REPUBLIC OF IRAN**

### **3-7-1- Policies and Priorities of Oil and Gas in I.R of Iran**

The export of oil is the most important item to provide the country foreign exchange requirement (almost 80 percent).Iran faces many problems to increase oil production capacity due

to lack of financial resources. National Iranian Oil Company (NIOC) seriously requires financial resources to provide facility for investment in upstream and downstream in order to increase the production potential to cover demand.

The capacity of oil production has increased to 4.2 M barrel per day at the end of 3<sup>rd</sup> five year plan due to development of oil and gas fields. The total capacity of oil production will be increased

to 5.2 M barrels per day if the total investment projected during 4<sup>th</sup> five year plan fulfill.

- The priority of NIOC investment in oil and gas sector is:
- Development of common fields
- Development of some green fields
- Using IOR/EOR to increase production of developed oil fields (Gas Injection, Water injection, lift gas, ...)
- Expanding the natural gas networks throughout the country and substitute to oil products
- To expand export of natural gas by pipeline, LNG and GTL,...
- Investment on NGL plant to process associated gas , Non associated Gas in order to produce some products as Condensate, LPG and Ethane.
- Investment on Condensate and heavy crude oil refineries as well upgrading the existing refineries.

Oil and Gas production capacity prediction in 1383 and during 4<sup>th</sup> five year plan including the required investment is shown in the following table.

**YEAR 1383 1384 1385 1386 1387 1388**

**OIL** 4159 4293 4446 4757 5002 5230

**GAS** 454 562 611 724 753 823

Different financial resources available for investing in oil and gas projects include:

*1- Internal resources:*

- Internal NIOC fund
- Government resources
- Foreign Exchange Reserve Fund

*2- Foreign resources:*

- Buyback Agreements
- Finance debt

- Joint Venture

The rate of financial return in buyback contracts which is dominant method of financing oil and gas projects in Iran is more than usual but is advised for some upstream projects which need liquidity, technology and management, and is more risky.

Joint venture which is another method of investment in downstream projects has been allowed on legal basis. The kind of investment is advised for some projects which need high technology as well as being capital oriented such as some LNG or GTL projects.

### **3-7-2- Iran Power Industry: Priorities, Policies & Fields for Cooperation with the D-8 Countries**

Total installed nominal capacity of power in 2003 was about 33257 MW of which 43.7% is generated from steam power plants, 20.7% from gas turbine power plants, 20.5% from combined cycle, 9.9% from hydro and 7.6% from diesel power plants. These power plants serve to more than 18,024,000 people. Total energy sale within the country was about 113533 Gwh.

Iran has electricity exchange with neighboring countries which includes:

- 30MW with Afghanistan
- 30MW with Pakistan
- 100MW with Iraq
- 70MW with Turkey
- 300MW with Armenia
- 400MW with Azerbaijan
- 400MW with Turkmenistan

Total energy sale to neighboring countries is 1200 GWh and total energy purchase is 1000 GWh.

The share of energy consumption in various tariffs in different sectors comprises of: household 33.4%, public 12.1%, agricultural 11.8%, industrial 31.9%, commercial 6.6% and illumination 4.2%.

#### **3-7-2-1- Iran Power Sector and Cooperation with D-8 Countries:**

The priority of power sector in I.R. Iran is to make further use of member countries opportunities for meeting the requirements of the country's power industry.

The main policy towards member countries includes among other things upgrading

technical, engineering and executive capability of the member countries.

Cooperation fields of Iran power sector with D-8 members includes:

- Giving priority to make use of technical, engineering and executive capability of corporations belonging to member countries to participate in international bidding of power industry projects in the member countries.
- Implementing generation and transmission projects in the member countries using BOT (Build-Operate-Transfer) scheme and reimbursement of investments through sale of electricity.
- Transferring operation of generation and transmission facilities belonging to the member countries via long-term contracts to other member countries.
- Notifying the description of surplus generation and transmission equipment (that can be exported) to the member countries during the coming years.
- Organizing joint market for purchase and sale of generation and transmission equipment and goods.
- Construction of manufacturing industries for generation and transmission electrical equipment.
- Electricity purchase and sale with the neighboring countries.
- Electricity transit from member countries for sale to a third member country.
- Study on promotion and attraction of foreign investments for construction of power plants by private sector in the member countries.
- Exchange of view and opinion as regard generation and transmission expansion planning in the member countries and execution of joint projects.

### **3-7-3- Renewable Energy in Islamic Republic Of Iran**

Due to the following reasons, I.R. Iran persuades policies for developing renewable energies within the country:

- To be in line with the world efforts to curb the world environmental problem
- To improve energy accessibility for remote and isolated places in the country
- To pave the way, among other things, for controlling urban air pollution
- The main policies followed include:
- Providing sustainable and accessible energy to the poor and isolated areas in order to

bring about improvement in life condition, and social development

- Creating renewable energy research centers to enhance technology performance and therefore reducing the initial cost of renewable systems.
- Laying foundation for renewable energy development by continual mapping of renewable resources which is important for defining priorities and policy making for both public as well as private sectors
- Encouraging private sector to invest in the field of renewable energy by preparing power purchase agreements for all renewable energy resources

Following the above-mentioned policies, achievements as bellow were realized:

- Ability to design and construct some of renewable energy systems
- Creating manufacturing facilities for wind turbines, solar water heaters, parabolic trough concentrators and solar photovoltaic panels both in public and private sectors
- Building necessary instruments for private sector participation in renewable energy development
- Experiencing geothermal drilling in harsh climate
- Introducing incentives for universities to participate in research and applications of renewable energy

Quantitative goals which are determined in the fourth 5 year development plan (2005-2009) regarding renewable energy are as bellow:

- 80 MW Small scale hydropower
- 200 MW Wind farm
- 100 MW Geothermal power plant
- 17.25 MW Solar thermal power plant
- 1 MW Fuel Cell
- 3 MW Photovoltaic
- 1,000,000 m<sup>2</sup> Solar Water Heater
- Some of the projects implemented during the third five year plan (2000-2004) in Iran include:
  - Renewable energy mapping for solar and wind energy, tidal and wave power, geothermal and biomass energy
  - Feasibility studies for solar thermal power plants, solar energy water heaters, solar dish,

wind turbines, wave and tidal power plants, and photovoltaic systems

- Installation of wind turbines with the total capacity of 15 MW in Manjeel area in the vicinity of Caspian sea
- Design, manufacturing and installation of a 600 kW wind turbine in Manjeel region
- Design and installation of grid connected and off- grid photovoltaic systems in different area with total capacity of 175 kW
- Design and installation of solar water heaters for urban and remote areas with total capacity of 30000 m<sup>2</sup>
- Installation of small hydropower plants in different parts of Iran with total capacity of 14 MW
- Wind farm in Manjeel with total install capacity of 11.2 MW

The ongoing projects which are under development by Ministry of Energy include the following:

- Small scale parabolic trough solar thermal power plant at the outskirts of Shiraz with the capacity of 250 kW
- Geothermal power plant with final capacity of 100 MW in vicinity of mount Sabalan
- Wind farm in Manjeel and Khorasan areas with total capacity of 120 MW.
- Small hydropower plants in different region with total capacity of 80 MW

Due to capital intensive nature of renewable systems, its large scale application is a burden to the national economy and therefore a supportive international financing mechanism is required. Renewable energy technologies are mostly immature and need improvement as well as breakthrough which is only possible through regional and international research cooperation and assistance. Hard work is needed to prepare ground for private sector effective investment in the field of renewable which is a key factor in making renewable energy cost effective and competitive as well as bring about innovation, creativity and dynamism.

### **3-7-4- Energy Efficiency Policies in I. R. of Iran**

Energy Efficiency Office of Ministry of Energy is composed of five groups including:

- Standard and Building Group
- Training and Awareness Group
- Transport Group



- Industry Group

Energy Efficiency Standards have been codified for the following equipments:

- Refrigerators and Freezers
- Evaporative Air-Coolers
- Washing Machines
- Pumps
- Hermetic Compressors
- Irons
- Electric Heaters
- Electric Water Heaters
- Compression Chillers
- Window- Type Air Conditions
- Single Phase Electrical motors
- Lamps
- Three Phase Induction Motors
- Cement Industry (process)

Six other equipment standards and 8 industrial process standards are under development.

Also some energy efficiency standards have been developed in National Energy Conservation Laboratory, including:

- Refrigerator and Freezer Laboratory
- Evaporative Cooler Laboratory
- Window-Type Air Conditioner Laboratory
- Washing Machine Laboratory
- Three Phase Electrical Motors Laboratory
- Single Phase Electrical Motor Laboratory
- Electrical Water Heater Laboratory
- Lamps Laboratory
- Air Conditioning Laboratory

Laboratories under development include Pump, Hermetic Compressor, Compression Chiller, Blower, Air Conditioning (Chiller, Fan Coils,...), Industrial Refrigerators, Compressors,....

The most important activities of energy efficiency office in industry Group include:

- Implementing projects of energy management in the cement, textile, casting, aluminum, sugar, glazed tile, ceramic, tire and wood and paper industries. The energy efficiency potential in these industries is estimated about 3.73 Mboe.
- Developing the energy consumption standards in the cement industry.
- The payment of interest of energy efficiency loans. A payment of \$ 2 million, results in 370000 BOE energy savings up to now.
- Legislating energy management in industries in order to prepare legal support for rational use of energy.
- Support Energy Services Companies (ESCOs)
- Preparing the integrated energy plan in industrial utility producer devices.

In 2003, the share of transport sector in oil products consumption was 52.06 %. Modeling the optimal transport demand pattern with emphasis on optimal energy consumption indicates that in goods transportation sector, the highest share is for light tracks. In the long-term it is planned to reduce this share and increase the share of trains and LNG-fired heavy tracks to more than 80%. In passengers sector, along with decline of gas oil consumption in bus and mini-bus, the share of bus and train in natural gas consumption will increase to about 80%.

The Experiences of energy efficiency office in the field of training and awareness include:

- Establishment of the network of friends in energy field as professional formation in different sub-sectors of industry, residential and transportation sub sectors for exchanging and sharing the members' experiences during seminars
- Training and Awareness campaign in students 10-15 ages on rational use of energy and environmental protection. There has been a significant difference (promotion of knowledge, behavioral change and energy saving in home and school) between a control group and selected group.
- Establishment of the National Training Center for Energy Management (NTCEM) with collaboration of JICA. 460 energy managers will be trained annually.

The decided goal is to achieve 15 Mboe energy saving (300 million\$) during the first 5 years activity of NTCEM. This means a 10% improvement in SEC.

Training courses in NTCEM contains:

- general courses
- heat courses and

- electricity courses

### **3-7-4-1- Proposals for Cooperation among D8 Countries:**

- Applied training of D8 industrial energy managers in Iranian and Turkish Training Centers and sharing the experiences learned.
- Expanding energy efficiency standardization and labeling in equipments and processes to all D8 members
- Use of the Iranian National Energy Lab for standardization, labeling and research services among D8
- Design and installation of Energy Conservation Lab in other D8 countries with the help of lessons learned in Iranian Lab
- Common research on natural gas technologies in both supply and demand sides
- Providing an energy database of implemented energy efficiency activities and useful experiences between D8 countries
- Exchange members experiences about:
  - energy efficiency legislation
  - utilizing financial aids and technical knowledge from international organizations
- Interchange energy experts among the members

## **4- TECHNICAL SESSIONS**

### **4-1- First Technical Session**

The first technical session was chaired by Dr. Sadeghi from I.R. Iran and co-chaired by Prof. A.S. Sambo from Nigeria. In this session, discussions were held on how to enhance exchange of energy information among member states by special focus on setting up of database for experts and energy institutes. In this regard, the Director General of Energy Information Center (EIC), Ministry of Energy of I.R. of Iran introduced EIC for participants.

#### **4-1-1 - Energy Information Center, Ministry of Energy, I.R. Iran**

Energy Information Center (EIC) was established in 1995. The purpose was to make energy related information available for planners, decision makers and policy makers, researchers & experts ,mangers & staff to make the right decisions and also for awareness of public with use of

EIC network and library with the latest information technology(IT) for Information Services.

EIC objectives among other things include:

- Providing requirements of government, experts, industries, managers, staffs and public.
- Collecting, organizing, processing, storing and presenting information to end-users
- Providing precise information and latest news in different fields of energy
- Providing comprehensive energy databank
- Providing integrated energy information system
- Providing library and network connection for making information available & accessible.
- EIC is collecting required information from energy producers and consumers and organizations continuously and annually. Information includes:

- Statistical information related to the energy carriers
- Energy experts
- Thesis and Projects
- Active Energy Centers
- Energy laws & regulation
- energy Standards of Consumer Products
- Energy Terminology

#### **4-1-2- Comprehensive Energy Databank system in Country**

“Iran Comprehensive Energy Databank” has been designed with the recent Information technology and includes the following databases:

*1-The Statistical Energy Database:* This database has primary and secondary information with high flexibility structure. Statistical information is about:

- Production and storage of renewable and nonrenewable energy carries
- Transferring and distribution of energy carriers
- Supply and demand
- Economic and environmental indicators

*2- Energy Active Centers Database:* This database is about the following active energy related centers with explanation of their activities:

- Governmental and private organizations
- Companies and producers

- Training and research centers
- Consultants, contractors
- Communities and committees

*3-Energy Experts Database:* “Experts Database” is about experts, consultants, executive managers, general directors and others who are involved in fields of energy with their histories and experiences. Data are collected, organized, processed and continuously added to databank by EIC.

*4- Database of Consumer Products Standards:* This database is about energy standards in the country including Number of standard, Title of standard and Text (information about standard).

*5- Energy Laws and Regulations Database:* Information of this database is about approved law and regulations of Islamic republic of Iran with bellow specifications:

- Being able to search in text and title of laws
- Full text of laws is accessible

*6- Energy Terminology Database:* It is a comprehensive Energy Terminology, Words and Terms related to energy in both English and Farsi, with bellow abilities:

- Searching meaning by words and terms
- Displaying diagrams and image related to terms with the reference

#### **4-1-3- Iran Proposal for Exchanging Energy Information among D-8 Member Countries**

The objective of exchanging energy information and setting up of Database for experts and energy institutes is cooperation for exchanging Knowledge and Experience for improvement and development of energy issues in each country. Exchange of energy information between participating countries should be done in the following issues:

- Energy business
- Development of databank on companies and experts active in energy and related issues
- Energy balance
- Exchange of energy experts
- Exchanging library information
- Books, journals, patents, thesis, newsletters as well as films and software.
- Exchange, share and present energy information via Internet
- In the field of Database development, the following issues have to be considered:

- Database will be established, developed and updated in each country
- Same logical data model (database structure and format).
- Same logical Database (physical database can be different like oracle, SQL server)
- Same Application for interface between all countries database.
- Non-dependency on operating system (Windows, Linux...) and databank (Oracle, SQL, Access...)
- Database should be accessible at the same time in the fastest and easiest way to participants
- Database can be designed with cooperation of technical groups of member countries.
- Each country is responsible for collecting and updating information and installation (hardware & software) of database.

After presentation on EIC, the chairman asked the D-8 delegates to explain whether they have any center for energy information and each delegate briefly introduced the energy information centers and institutions and organizations concerned with collection of data on energy.

#### **4-2- Second Technical Session**

To exchange ideas on how to set up an “International Energy Institute for Training & Research “ for development of human resources, the second technical session was held on the second day of the meeting. Chaired by Dr.Karbassi, I.R. of Iran, two presentations took place as follows.

##### **4-2-1-Institute for International Energy Studies (IIES)**

Institute for International Energy Studies (IIES) started its activities as one of the Ministry of Petroleum affiliates in 1991. Implementing research studies and projects with the aim of supporting policy making processes in the field of energy, particularly oil and gas, are considered major missions of IIES. IIES undertakes a wide range of activities as follows:

- Research on international energy markets and energy economic issues
- Exchange of scientific findings with other international institutes
- Promoting technical knowledge of middle managers and employees of oil and gas industries

To this end, IIES has invited more than a hundred local and foreign energy experts, engineers,

economists, and political economists. IIES information center and library has established strong links with other local and international research centers.

Benefiting from its potentials, IIES attempts to make contributions to the achievement of the country's development goals through organizing short-term and long-term training courses and implementing scientific and research projects. IIES research groups completed 88 research projects and studies.

IIES has arranged and run several short-term training courses. Furthermore, the institute recognized by the Ministry of Science, Research, and Technology as a center for higher education succeeded to run a masters' course on energy economics. The graduates of the aforementioned course are working in different organizations of the Ministry of Petroleum and other energy companies.

IIES constantly organizes a wide range of short-term training courses and workshops as follows:

- Energy conservation and energy optimization
- Economics of oil upstream
- Economics of oil companies restructuring
- Training courses for journalists
- Evaluating energy projects
- Derivatives and Risk management in oil markets
- Refining workshop
- Energy modeling workshop
- Workshop of Derivatives and Risk management in oil markets
- Energy master planning workshop
- Several seminars and meetings on energy economics

#### **4-2-2- Iran Energy Efficiency Organization (IEEO)**

IEEO was established in 1996 as government-cum-private Company. In 2000 as a government Co. affiliated to Ministry of Energy and in 2002 as a government company was affiliated to TAVANIR.

The purpose of IEEO establishment was:

- Promotion of energy efficiency in all energy sector (excluding transport)
- Preservation of natural resources

- Reduction of emissions from energy sector for betterment of environment and global warming combat

- Reduction of energy consumption by home appliances

With a total of 80 employees which will reach to 93 by the end of the year 2005, IEEO is composed of the following departments:

- Technical & Research

- Education & Awareness

- Environment

- Energy Conservation Laboratory

- Note 12

- Regional Offices (in 6 major provinces)

Evaluation of IEEO activities indicates the following yearly savings:

- 700 thousand barrel of oil equivalent through education and awareness activities in just 60 factories (90 more factories are under investigation)

- 350 thousand barrel of oil equivalent through no & low cost measures provided by department of Technical & Research in 24 factories (176 more factories are under investigation)

- 370 thousand barrel of oil equivalent through activities of department of Note 12

- 1.5 million barrel of oil equivalent through labeling activities

Nearly 3 million barrel of oil equivalent energy has been saved (almost US\$ 90 million). IEEO goal is to save 20 million barrel of oil equivalent/year in the next five years (4th five year socioeconomic

plan) which is equal to 7 days oil export capacity of the country.

#### **4-4-2-1- Grounds for Mutual Cooperation**

- Exchanging experiences in the field of energy auditing

- Exchanging experiences in the field of education and awareness

- Exchanging experiences in the field of setting up energy laboratory

- Exchanging experiences in the field of various means of incentives for promotion of energy efficiency activities such as Note 12



- Exchanging experiences in the field of environmental aspects such as site selection by GIS

#### **4-4-2-2- Proposed chart of cooperation**

#### **5- Meeting Statement**

At the end of the meeting, a brief report of the meeting was prepared by draft committee. At the end of the meeting the delegates took the following decisions/recommendations which would be tabled to the forthcoming D-8 Council of Ministers Meeting:

1. The delegates agreed on the need to have a uniform format for database of energy experts and institutions and mandated Iran to handle the matter and make available the proposed format to other members in two months for their inputs and subsequent adoption.

2. The delegates observed that there is need for member nations to optimize their per capita energy consumption while ensuring economic viability and ecological sustainability.

Environmental concerns should be taken into account in all stages of the Energy chain within the framework of sustainable development.

3. There should be restructuring and reform of the energy sector of the member nations to increase private sector participation, productivity, and efficiency as well as to enhance technology transfer amongst member nations.

4. There should be intensified efforts on R&D in energy technology.

5. Energy efficiency and conservation should be an integral part of our energy Programs and member nations are requested to share their experiences in this regard.

6. Renewable energy technologies should receive particular attention in the energy mix of member nations.

7. It was agreed that the D-8 Energy Experts meeting should hold annually and the hosting to be rotated amongst the member nations. It was also agreed that the venue for the next meeting that is of 2006, would be decided by the D-8 Council of Ministers.

8. Member nations should develop suitable decision models to simulate the future of optimum energy flow and to minimize the total cost of energy supply among them.

9. The establishment of “D-8 Energy International Institute for Training and Research” as proposed in the first expert meeting in Abuja is re-emphasized. Iran is supposed to modify

its proposal in line with inputs of delegates. Thereafter Iran was to send the revised proposal to member nations.

10. It is recommended that a representative from the D-8 secretary attend the working group meetings.

11. It is recommended that special sub-committees to be organized to follow up the decisions of this meeting especially to identify the areas of cooperation among member states as regards energy efficiency, renewable energy, energy trade, energy research and training center, and energy database.

12. The warm hospitality granted by Iran, to the delegates, was gratefully acknowledged.