FEDERAL MINISTRY OF SCIENCE AND TECHNOLOGY
CHEMICAL TECHNOLOGY AND ENERGY RESEARCH DEPARTMENT
4th Floor, Federal Secretariat Complex (Phase III), Abuja, Nigeria
P.M.B. 331 Garki Abuja, Fax: 5235204

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His Excellency,
The Secretary-General
Organization for Economic Cooperation
Among Eight Developing Countries, D-8
Mayar Akar Center,
Buyukdere Cad.100-1-2
Kat: 22, D:87
Esentepe 80280
Istanbul, Turkey

FORWARDING OF THE REPORT AND COMMUINQUE OF THE 1ST D-8 EXPERTS' WORKING GROUP (WG) MEETING TO INITIATE COOPERATION BETWEEN D-8 SCENTIIFIC INSTITUTIONS, RESEARCH INSTITUTES AND UNIVERSITIES 2ND -03RD JUNE, 2009, ABUJA, NIGERIA

I have the honour to forward herewith the Report and Communiqué of the above Experts' Working Group meeting which Nigeria hosted from 02-03 June, 2009 at Rockview Hotel, Abuja, Nigeria.

2 It would be appreciated if this is circulated to all D-8 member States for their information.

3. Please accept the assurances of the D-8 Commissioner's highest esteem at all times.

A.O. Oyefeso

A.O.Oyefeso
for: Nigeria's D-8 Commissioner/ Permanent Secretary
Federal Ministry of Science
and Technology

REPORT OF THE 1ST D-8 EXPERTS' WORKING GROUP (WG) MEETING TO INITIATE COOPERATION BETWEEN D-8 SCIENTIFIC INSTITUTIONS, RESEARCH INSTITUTES AND UNIVERSITIES.

02 – 03 JUNE, 2009

ABUJA, NIGERIA

1. The Government of the Federal Republic of Nigeria organized and chaired the 1st D-8 Experts' Working Group Meeting to initiate cooperation between D-8 Scientific Institutions, Research Institutes and Universities on 02 – 03 June, 2009 in Abuja. The meeting was in fulfillment of one of the resolutions reached during the 5th D-8 Heads of States / Government Summit at Indonesia and subsequent Commission meetings. The meeting was attended by delegations from seven member states; namely – Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan and Turkey. The list of participants is attached as **Annex I**.

2. The Acting D-8 Commissioner of Nigeria, His Excellency Engr. Wahab K. Jimoh in his opening speech reminded participants of the main objectives of the D-8 Organization. He emphasized on the theme of the Meeting; **"The Role of Energy Research and Development (R&D) in meeting D-8 objectives"**. He further highlighted that collaboration and development in Energy R&D are of uppermost importance for two main reasons: - (a) the increasing search for global energy availability and accessibility at an affordable price for the teeming population of the world, and (b) Search for the use of a more environment – friendly energy resources. The full text of his welcome statement is attached as **Annex II**.

3. The Executive Secretary, National Universities Commission (NUC), Prof. Julius Okojie represented by Dr. Salihu M.A., and the President, Manufacturers' Association of Nigeria, Alhaji Basiru Mohammed Borodo represented by Mr. Asibong Eneobong respectively delivered their goodwill statements. Prof. Okojie in his statement went down the memory lane on

the transformation that had taken place in the Nigeria University system over the years. Furthermore, he underlined the joint efforts of the D-8 member countries that enabled them to initiate cooperation among Scientific Institutions, Research Institutes and Universities on Energy Research & Development. Alhaji Borodo highlighted the need to identify ways of promoting and strengthening collaboration between the private sector and Energy R&D Institutes and Universities. The full texts of their statements are attached as **Annex III and IV**.

4. The Desk Officer of Nigeria's D-8, Dr. Julius Afolabi Aremu gave a vote of thanks that ended the opening session. In his statement, he thanked members of staff of the D-8 Secretariat, Turkey and in particular the Secretary General, Dr. Dipo Alam for his leadership qualities. He also appreciated the efforts of all the delegations of member countries that were present. In addition, he expressed his gratitude to the President of the Federal Republic of Nigeria, Alhaji Umaru Musa Yar'Adua GCFR and Nigeria's Acting D-8 Commissioner for their contributions towards the hosting of the meeting. Finally he thanked the Ministry of Foreign Affairs, Local Organizing Committee, members of the press and participants.

5. At the end of the opening session, delegates were conducted round the Exhibition Stands mounted by:
   - Energy Commission of Nigeria (ECN) Abuja, Nigeria
   - Raw Materials Research & Development Council (RMRDC) Abuja, Nigeria
   - Sokoto Energy Research Centre (SERC), Usman Dan Fodio University, Sokoto Nigeria, and
   - Project Development Institute (PRODA) Enugu, Nigeria

6. During the technical session, five member states made presentations which were discussed in detail. The highlights were as follows:

A. REPUBLIC OF INDONESIA

Indonesia has a total land area of 9 million square miles with 17,508 islands. Fossil energy reserves and production in year 2007 showed that the country had 8.403 billion barrel and 164.99 tonnes of crude oil and natural gas reserves respectively. However the reserves are limited.

RENEWABLE ENERGY DEVELOPMENT

The renewable energy potentials available in the country are hydro, geothermal, biomass, solar and wind energy. Geothermal is ready for new investment to generate 24,460MW of electricity. The country's target of the National Energy Mix by the year 2025 is as follows.

Primary Energy Mix 2005	Primary Energy Year 2025	Primary Energy Mix 2025(Presidential Degree) Energy Optimization
Hydro-3.72%	Hydro1.9%	RE – 17%: (Biofuel-5% Geothermal-5% Biomass, Nuclear, Hydro,Solar,Wind-5% Coal liquefaction-2%)
Geothermal-2.48	Microhydro-0.1%	Crude oil-20%
Crude oil-2.48%	Geothermal 1.1%	Natural gas-30%
Coal-16.77%	Crude oil 41.7%	Coal-33%
Natural gas -22.24%	Coal34.6%	RE476 MIIL BoE
RE: 44 MillBoE	RE: 155MIIL BoE	

ELECTRICITY UTILIZATION

Growth of Electric Power Demand is at the rate of 7.1% per year while utilization of primary energy sources to produce electricity is:

Coal – 37%

Gas – 15%

Oil – 37%

Geothermal – 3% and

Hydro – 8%

Other details in Indonesia include:

- Total Installed Capacity - 29705MW
  - PLN (National Power Board) - 24,925MW (83.29%)
  - Independent Power Producers (IPP) - 3984MW (13.14%)
  - Private Power Utility - 796MW (3.30%)
- Electricity tariff is 6.8cent USD/KWH (1USD=Rp9.162) Rp=Indonesian currency.

Electricity supply is through what is known as the System which entails three islands being interconnected for electricity supply, while other islands have isolated or 'decentralized' electricity supply system.

B ISLAMIC REPUBLIC OF IRAN

Iran has large resources of energy such as oil, solar system, wind and water. Old technologies are not fully capable of efficient use of these energies; hence nanotechnology is employed to help refine and reprocess these resources. There is an increasing importance of nanotechnology in the areas of energy, agriculture, health etc.

The Iranian Nanotechnology Initiative Council (INIC) has a ten (10) year national plan as passed by the Iranian Cabinet in July 2005. The goal of the plan was to be

among the top 15 countries in the world in all ring of value chain: knowledge generation, technology development, industrial production and wealth creation with priorities in the areas of energy (oil, gas and petrochemicals, solar cells), health, water, environment, nanomaterials and construction.

APPLICATIONS

In Iran, Nanotechnology has been developed in the following areas:

- Hydro conversion: a very novel way to convert heavy crude oil to light crude oil using nano catalysts; a pilot of 10.000B/day is being built.
- Carbon nanotube Production; a 8kg/day CNT Production Plant.
- Nano Additive for Motor oil; an additive for improving the performance of motor oil and therefore energy saving, it is available in the Iranian market.
- Breast cancer diagnostic kit; diagnostic kit for early detection of breast cancer. It is passing clinical tests and it will be in the market within one year.
- Nanosilver and other nano-particle.

Prospects exist of nanotechnology solving humanity's top ten problems within the next fifty years in the areas of energy, water, food, environment, poverty, terrorism and war, disease, education, democracy and population.

FUNDING

Nanotechnology Funding in Iran between the year 2004 and 2008 were as indicated below;

State Funding	-	$47m
Public Organization	-	$35m
Private Sector	-	$75m
Totaling	-	$157m.

INTERNATIONAL COOPERATION

Iran has cooperation with Germany, Russia and India which led to joint organization of Workshops and Conferences towards enriching their knowledge on nanotechnology. On capacity building, Iran has 15 universities engaged in M.Sc Programmes, 5 Universities running Ph.D programmes with more than 50 universities and research institutes involved in nanotechnology research and development (R&D) activities. The 151 publications – 1st quarter of 2009, ranks Iran 16th in the world in the development of nanotechnology with 3 international patents published.

RECOMMENDATIONS

On the issue of cooperation and collaboration, Iran recommended that member countries could:

I. As much as possible learn about energy
II. As much as possible learn about nanotechnology.
III. Make a network for sharing capabilities and developing nanoscience.

C. FEDERAL REPUBLIC OF NIGERIA

The provision of reliable energy is crucial to Government Developmental Agenda. In recognition of this, the Government of Nigeria established a number of Research and Development (R & D) institutions on various energy types, crude oil, natural gas, hydropower, coal, nuclear, biomass etc. The Nigeria electricity supply industry has an installed capacity of about 7,876 MW but only 3,500MW is available at any time giving rise to massive load shedding. Over the years, it has been difficult to meet consumers demand and accordingly this has affected the country's socio-economic development. Nigeria has crude oil production capacity of about 2.6 million barrels per day (mbd), but actual production is much less.

ENERGY POLICY

The energy policy in Nigeria is directed towards development and utilization of the nation's energy resources on a self-sustained basis through research, development and training.

STRATEGIES

To achieve the above policy, the following strategies were Identified:

i. Developing and promoting local capability in the Nation's Energy Centres and Research Institutes.
ii. Promoting the demonstration and dissemination of renewable energy devices and technologies for their adaptation and market penetration.
iii. Monitoring and assessing international technological development in all energy areas for applications in all sectors of the economy.
iv. Establishing training programmes for the development of specialized energy manpower, etc.

RENEWABLE ENERGY (R & D) SITUATION

Nigeria though among the countries with abundant fossil fuel reserve, is not left out in the endeavour to diversify its energy resources. Nigeria is blessed with variety of renewable energy resources which are well distributed throughout the country. The technologies for harnessing some of these resources have been developed or domesticated. To consolidate this, the Federal Government in 1980 established two universities based National centres for renewable research and development at Sokoto and Nsukka. At the moment research into Biodiesel production using the Jatropha seed oil is ongoing.

NUCLEAR ENERGY (R & D) ACTVITIES IN NIGERIA

Nigeria's nuclear programme started in 1976 when the Nigeria Atomic Energy Commission (NAEC) was established by Act 46 and given the mandated to develop the framework and technical pathway to explore, exploit and harness atomic energy for peaceful application for the socio-economic development of Nigeria. In pursuance of this, two nuclear energy centres were established at Obafemi Awolowo University Ile Ife and Ahmadu Bello University, Zaria with the responsibility for conducting Research, Training and Development in nuclear Science. Furthermore, the Energy Commission of Nigeria (ECN) was created in 1979 by Act 62 to provide strategic plans and formulate national policies on energy. The two centres mentioned above were initially under the supervision of

the ECN due to the delay in the take off of the Nigeria Atomic Energy Commission (NAEC).

By 1993, the Federal Government established Sheda Science and Technology Complex (SHESTCO) similar to the PUSPITEK in Indonesia, with cutting-edge laboratories in basic research and applied sciences and a 30MW nuclear research reactor for materials testing

To put the nation's nuclear programme in a better perspective, the Nigerian Nuclear Regulatory Authority (NNRA) was established in 1995 with the responsibility to regulate the entire nuclear industry.

R & D ACTIVITIES ON COAL AS ALTERNATIVE SOURCE OF ENERGY

Coal research and development has virtually been non-existent in the country from its discovery in 1916. However, the Report on the National Fuel Wood Substitution Programme identified coal as the most viable alternative to fuel wood. Subsequently, a Presidential directive based on the report mandated the Project Development Agency (PRODA) of Nigeria, a parastatals under the aegis of the Federal Ministry of Science and Technology to carryout full research on coal beneficiation via low temperature carbonization to produce briquetted solid smokeless fuel (semi-coke). This gave birth to active coal research and development activities in Nigeria.

ENERGY EFFICIENCY AND CONSERVATION R & D ACTIVITIES IN NIGERIA

The Nigerian Government recently approved the establishment of the National Centre for Energy Efficiency and Conservation (NCEEC), Lagos.

Main thrust areas of the NCEEC include;

- Conducting R & D and promoting the implementation of energy efficiency programmes.
- Creating awareness and disseminate information on energy efficiency
- Formulating energy efficiency and demand side management programmes that encompass and target various economic sectors
- Undertaking educational programmes and policy promotion.

CHALLENGES

Energy Research Institutes/Centres and other tertiary institutions involved in energy R & D are striving to meet their mandates. However, these institutions are faced with a number of constraints which include;

- Inadequate insight into the process of commercialization of R & D results.
- Inadequate funding and infrastructure in some areas
- Lack of adequate research equipment
- Poor linkage with the source of technology
- Inadequate manpower

WAY FORWARD

In order for Nigeria to derive the best from its energy R & D activities, it is suggested that the following should be put in place;

- Improved funding
- Provision of adequate and up- to- date research equipment
- Provision of adequate physical infrastructure and support facilities and maintenance.
- Improved manpower and capacity development.
- Improved commercialization of R & D results
- Improved linkage progammes.

INVESTMENT AND AREAS OF COLLABORATION

Member countries are invited to make positive investment decisions in Nigeria's energy sector. In a related development, possible areas of cooperation and collaboration with member states include:

- Marketing Energy R & D Outputs
- Training on Biofuels Technologies
- Training on Nuclear Power Technology
- Energy Efficiency and Conservation Strategies
- Energy Databank Development
- Energy Policies and Master Plan Development
- Coal Research, Development and Utilization

- Development and utilizations of Geo-Thermal Energy and Hydrogen Fuel-cell.

D. ISLAMIC REPUBLIC OF PAKISTAN

Pakistan is a country with a population of about 170 million. It has a literacy rate of about 53% which comprises of 65% male and 40% female. The high literacy rate has been attributed to the reforms undertaken by Pakistan in Higher Education. The Higher Education Commission established in 2002 has the mission to facilitate institutions of higher learning to serve as engine room for the socio-economic development of Pakistan.

RELEVANCE: KNOWLEDGE BASE FOR ECONOMIC GROWTH

The reforms implemented by the Higher Education Commission in Pakistan since its establishment in 2002 have been impressive with spectacular progress in Science and Technology. Pakistan now has:

- 85 R & D organizations; 35 under Federal Government and 50 under provincial Government.
- 239 institutes, laboratories and research stations

Pakistan's guiding principles of a knowledge base society for economic growth is hinged on supporting excellence in key economic sectors, link to the local and regional economy and linkages with industry.

KEY CHALLENGES IDENTIFIED IN HIGHER EDUCATION SECTOR

Every successful reform in any sector of the world comes with its own challenges. Hence, Pakistan's Higher Education sector had to contend with the following challenges especially in the areas of access and equity (low enrollment, limited opportunities for deserving students of less developed areas); quality (standard of faculty and lack of training/capacity building; low quality of teaching and research as well as poor governance of universities); and lastly the issues of relevance (minimal relevance to regional, national and global needs).

Consequently, the following steps are being taken to address these challenges:

- Establishment of women university to cater for female enrolment in higher education
- Standardization of degree programmes
- Building global knowledge networks: PERN II connectivity with US SSIT agreement, where 39 projects were funded over 4 years.
- Research support programmes: research grant, post doctoral fellowships, Pakistan organization for collaborative research, sponsorship of conferences, travel grants, extension lectures, access to scientific institution and support of scientific journals.

In addition, Pakistan gives incentives for researchers to enhance research activities by way of building centralized laboratories in major universities, digital library, access to leading e-journals/e-books and duty free import of research equipment. Others include award of scholarships, subsidizing loans for patent applications and research productivity allowance. These gave rise to:

i. Increase in research publications by researchers in International Journals.
ii. 3 Pakistan universities being ranked among the top 600 universities in the world.
iii. Research growth from Pakistan ranked 1st in five areas namely: Computer Science, Engineering, Materials Science, Mathematics and Plant/Animal Sciences. This is referred to as Pakistan Rising Star.

REQUIREMENTS FOR RAPID PROGRESS

These have been articulated as follows:

- Human capital with knowledge and skills
- Technology (Innovation/Entrepreneurship)
- Infrastructure and incentives to innovate
- Regulation; Intellectual property
- Rights and fast commercial courts

POLITICAL WILL

It must also be emphasized that there is the need for political will from the Government of Pakistan Government in order to achieve the following:

- Science and Technology budget increase.
- Higher Education budget increase.
- New Information Technology (IT) Ministry establishment.
- Full support at the highest level.
- A real beginning after 30 years of neglect.
- Moving towards knowledge economy.

PAKISTAN ENERGY OVERVIEW

As at 2004, Pakistan had an installed electricity grid capacity of 20.4 GW (ie 20,400MW) where conventional thermal plants using oil, natural gas and coal accounted for 66%, hydroelectricity 32% and renewable 2%. At present, Pakistan is facing severe load shedding due to shortage of about 3 GW (ie 3,00MW) power supply.

It is estimated that by 2010, generating capacity would increase by more than 50%. Although it lags behind in renewable energy generation, effort is being made to address that as more institutes have been established, especially due to abundant coal reserve and wind resources.

NUCLEAR ENERGY TARGETS (YEAR 2005-2030)

On nuclear capacity targets, Pakistan is envisaging a nuclear installed capacity of at least 8,800MW by 2030. She also belongs to a number of International Organizations such as International Atomic Energy Agency (IAEA), world Nuclear Association etc. On a general term, it should be noted that:

- Pakistan is facing severe energy crises.
- A broad mix of fuels including alternate energy resources can diversify Pakistan's Energy Mix, thus improving energy security.
- The shares of renewable and fossil fuel in commercial energy supply would be 13% and 84% respectively.

WAY FORWARD

In order to address the challenges enumerated earlier, the following issues are being considered:

- The concept of nuclear power parks advocated by PAEC since 2003 be followed for future (Nuclear Power Plants) NPPs in Pakistan.
- Non-discriminatory approach by NSG towards Pakistan.
- All Nuclear Power Plant (NPPs) should be under IAEA Safeguards.

Pakistan urged D-8 member States to avail others their area of comparative advantage for possible collaboration to enhance development of the economy.

E. REPUBLIC OF TURKEY

In order to have a solid energy policy, Turkey is investing in capacity building. To this end, Turkey's national priority in terms of energy research and development (R & D) is hinged on:

- Knowledge-based society Innovation (National Innovation System).
- Investment in Human Resources by establishing new universities and strengthening old ones.
- Lifelong learning.
- Investment in research and development (R & D) and
- University-Business relation

FUNDING

Turkey provides several research grants allocated to R & D. These are through:

- Tubitak: Turkish Research Funding Organization
- Universities, Scientific Research Fund
- Various other public organizations

In this regard, the structure of R & D process in putting ideas to work and patent to the market is as follows;

Intellectual property rights→Technology→Product→Marketing

ENERGY

There is presently a huge difference in energy demand and supply; i.e. demand is greater than supply. This led to the establishment of renewable energy market to take care of the energy policies with the highlights being;

- Lifting of State monopoly
- Establishment of independent agency on energy
- Specialized energy production zone
- Increased renewable energy resource which is environment friendly
- Dependable electricity supply leading to economic and social development.

RECOMMENDATIONS

Turkey identified the way forward to include amongst others the following strategies:

- Increased investment in Human Resources
- Increased investment in R & D
- Joint R & D Trans-disciplinary and cross-country
- Commercialization of R&D products
- Initiate cooperation among D-8 scientific institutions-universities project based with the spirit of triple Helix:
  UNIVERSITY + PUBLIC + PRIVATE.

7. SECTORAL ENERGY GROUPS DISCUSSION

Delegates held sectoral discussions on Nuclear, Renewable, Coal, Nanotechnology etc with the aim of initiating bilateral/multilateral cooperation in the identified energy R & D sectors

8. ADOPTION OF COMMUNIQUE

The draft communiqué was discussed in detail and at the end, the meeting adopted it. A copy is attached as Annex V.

9. CLOSING

The chairman and Nigeria's D-8 Desk Officer, DR J.A Aremu in his closing remarks thanked all the delegates for their robust and productive discussions during the meeting which culminated into the huge success of the meeting. He wished everyone safe journey back home.

Dr Shalik from Pakistan, on behalf of other delegates, expressed his gratitude to the Government and people of Nigeria for their very warm hospitality. He also thanked the D-8 Secretariat for organizing the Meeting. Finally, he commended the Chairman for his sterling leadership quality in steering the conduct of the Meeting to a successful end.