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Report of the Regional Implementation Meeting of the Economic and Social Commission for Western Asia

I. Introduction

1. The Commission on Sustainable Development, at its fourteenth session to be held from 1 to 12 May 2006, will undertake a review of progress achieved at all levels in the implementation of commitments, targets and goals on the thematic cluster of "Energy for sustainable development, atmosphere/air pollution, climate change and industrial development".

2. The report of the Secretary-General, to be submitted to the Commission on Sustainable Development at its fourteenth session, will present a review of the state of the progress achieved at all levels in the implementation of the commitments, goals and targets related to the four thematic areas agreed upon in Agenda 21,[1] the Programme for the Further Implementation of Agenda 21,[2] the ninth session of the Commission and the Plan of Implementation of the World Summit on Sustainable Development ("Johannesburg Plan of Implementation").[3]

3. The Arab region consists of 22 countries, 10 in Africa and 12 in Western Asia. In 2003, the total population of the Arab region was 305 million, representing 4.7 per cent of the world's population. However, population size varied remarkably among the countries of the region, ranging from 67.3 million in Egypt to less than l million in Qatar, Djibouti and Bahrain. In the last two decades, the Arab population grew at an average rate of 2.6 per cent per annum, in comparison with a rate of 1.5 per cent per annum in the rest of the world, with an increase in the proportion of urban population from 44 to almost 54 per cent. The proportion of rural population varies widely among the countries in the region; in 2002, that proportion ranged from a figure as low as 4.0 per cent in Kuwait to one as high as 75.3 per cent in Yemen, with a regional average of 46.3 per cent, which represented about 139 million persons in rural areas in 2002.

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4. In the human development index of the United Nations Development Programme (UNDP) *Human Development Report, 2004*,[4] where 177 countries were categorized according to level of human development, the Arab countries ranged in rank from "medium" (the Gulf Cooperation Council (GCC) countries and the Libyan Arab Jamahiriya) to "low" and "very low" (Mauritania ranked 152 with a Human Development Index for 2002 of 0.465). Meanwhile, the development and poverty situations in the region are highly uneven and poverty is a serious problem in most of the Arab countries. In 2003, five countries in the region had a gross domestic product (GDP) per capita of about $1 per day. Almost 85.0 million, constituting almost 30 per cent of the region's total population, had been below the poverty line of $2 per day in the year 2000, excluding Somalia which is classified as a low-income country under stress.

5. The present report has been prepared to serve as the Arab regional review report on progress achieved at regional and subregional levels in the implementation of the commitments, goals and targets related to the four areas of the thematic cluster of issues for the implementation cycle 2006-2007 to be addressed at the fourteenth session of the Commission on Sustainable Development; it also reflects on the challenges and opportunities related to the implementation of such goals and targets in the Arab region as well as spotlights the priority areas for action for further implementation in the four thematic areas.

6. The report has been prepared through a process of collaboration among the League of Arab States, the Economic and Social Commission for Western Asia (ESCWA) and the United Nations Environment Programme Regional Office for West Asia (UNEP/ROWA). It incorporates the country inputs and comments received before and during the regional Arab conference on "Energy for Sustainable Development and Related Environmental Issues", held in Cairo from 10 to 12 September 2005. It was discussed and agreed upon by the Arab Regional Implementation Meeting in association with the Joint Committee on Environment and Development in the Arab Region during its seventh session held in Cairo from 13 to 15 November 2005.

7. The report comprises four main sections, on:

(a) Energy for sustainable development;

(b) Atmosphere/air pollution;

(c) Climate change;

(d) Industrial development.

II. Energy for sustainable development

A. Status of the Arab energy sector[5,6,7]

8. The Arab energy sector has played and will continue to play an important role globally as well as within the region. It is serving as the source of oil and gas export revenues and satisfying energy needs for economic and social development; however, in many cases, the efficiency of energy production and consumption patterns in the region requires improvement. More than 40 per cent of the population in rural and urban poor areas do not have access to energy services or are

highly underserviced. The move towards achieving the objectives of energy for sustainable development requires action to solve such problems, while maintaining the effective contribution of the sector to the region's economy. The following is a brief overview of the current status of the energy sector in the Arab region, which highlights the relation among energy access, human development and poverty in the region.

9. The Arab energy sector is characterized by a huge oil and gas sector and a large electric power sector which is dominated by thermal power generation (92 per cent). On the end-use side, the sector is serving all other sectors, of which the highest consuming ones are the transport, residential, industry and utility power sectors.

10. The Arab oil and gas sector represents the largest economic sector in the region. In 2003, the total proved reserves of crude oil in the Arab countries reached 650 billion barrels, representing 57.0 per cent of the world total reserves, while those of natural gas were estimated at about 52.3 trillion cubic meters (m^3), representing about 30 per cent of the world proved reserves. The region also enjoys good renewable energy resources with 8,967 megawatts (MW) of installed hydroelectric capacity. Solar resources vary between 1,460 and 3,000 kilowatt-hours per square metre (KWh/m^2) per year. Wind resources are also available in several Arab countries.

11. The electrification rates in the Arab countries in 2000 had varied from 100 per cent in Kuwait to 7.7 per cent in the Comoros, Djibouti, Mauritania and Somalia, with an average of about 79 per cent, compared with a world average of about 72.8 per cent and an average in the developing countries of 64.2 per cent. In 2003, about 64.3 million people, representing 21.4 per cent of the Arab population, had no access to electricity, and as many were severely undersupplied, both in rural and in poor urban areas. It is also to be noted that almost one fifth of the Arab population rely on non-commercial fuels for different energy uses. Poverty, which has a direct link to access to energy, is a serious problem in many Arab countries and there is an urgent need for vigorous new policies to increase accessibility to energy of rural and urban areas with the aim of addressing energy needs and mitigating human poverty.

12. The total 2003 primary energy production in the Arab region was about 28.9 million barrels of oil equivalent per day. The oil and natural gas shares reached 77.3 per cent and 22.2 per cent, respectively. The generated electricity in 2003 in the region was about 509,800 gigawatt-hours (GWh). The production of hydroelectricity reached 145,400 barrels of oil equivalent per day (about 7.3 million tons of oil equivalent per year), while the new renewables, including mainly solar water-heaters, small-scale photovoltaic applications and wind farms, totalled about 1.0 million tons of oil equivalent per year (20,000 barrels of oil equivalent per day).

13. The total consumed commercial primary energy in 2003 was about 364.0 million tons of oil equivalent with a growth rate of 4.2 per cent between 1996 and 2002. The shares of energy resources in such consumption were 52.3, 45.3 and 2.5 per cent for oil, natural gas and hydro resources, respectively. These figures reflect the gradual increase in the share of natural gas in primary energy consumption during the 1990s. The total installed capacity in 2003 reached 115,828 MW excluding the Comoros. Such huge capacity was dominated by thermal power stations accounting for more than 92 per cent. Electricity consumption reached 443.6 GWh accounting for 87 per cent of the total generated electricity.

14. The residential, industrial and transport sectors are the major energy consuming sectors in the Arab region. The residential sector consumes about 55.5 per cent of total electricity and 17.9 per cent of total petroleum products in the region. By contrast, the industrial sector consumes only 26 per cent of generated electricity and 16.7 per cent of the petroleum products; the transport sector remains the largest consumer of petroleum products, accounting for 43 per cent of total regional petroleum consumption, although it consumes very little electricity. Energy consumption indicators in 2003, were as follows:

(a) The average primary energy consumption in the region reached 1,196 kilograms of oil equivalent per capita, compared with the world average of 1,523 kilograms of oil equivalent per capita. Wide disparities exist in the levels of energy consumption within and between Arab countries;

(b) The average electricity consumption reached 1,445 kilowatt-hours per capita regionally, compared with the world average of 2,271 kilowatt-hours per capita;

(c) The average primary energy intensity in the region was 0.51 kilograms of oil equivalent per United States dollar compared with a world average of 0.27 kilograms of oil equivalent per United States dollar, reflecting the low economic returns on energy consumption in the region.

B. Progress achieved[8,9,10,11]

15. Since 1992, national authorities in Arab countries have devoted efforts to improving the sustainability of their energy sector. Such efforts covered most of the goals and targets relevant to the key energy issues identified by Agenda 21, the Programme for the Further Implementation of Agenda 21, the ninth session of the Commission on Sustainable Development and the Johannesburg Plan of Implementation. Some progress was achieved; however, steps are still required to further adopt sustainable energy policies and measures that can support the sector's contribution in respect of achieving sustainable development. In addition, several regional initiatives and activities were implemented, either among countries in the region or by the concerned United Nations organizations, and regional Arab organizations.

1. Integration of energy policies

16. During the last three decades, energy policies in the Arab region were directed mainly towards satisfying the needs of the development programmes and upgrading the sector's infrastructure and capabilities.

17. The fact that energy prices in the region are highly subsidized has led to accelerated demand growth rates, low energy use efficiencies, and the need for high capital investment. Therefore, in recognition of the need to move towards more economic and sustainable management of the sector, countries in the region have revised their energy policies and included one or several of the following sector sustainability policies:

(a) To increase energy access for all communities mainly in rural and remote areas;

(b) To review existing tariffs so as to support the economic management of the sector while maintaining energy subsidies for the poor;

(c) To enhance investments in oil and gas exploration and production activities, using cleaner technologies, and to adopt measures for reducing the sector's environmental impacts;

(d) To study and implement intraregional electric grid interconnections and natural gas networks projects;

(e) To encourage private sector participation in the establishment and management of energy facilities, including power plants and distribution networks;

(f) To adopt measures and programmes for upgrading energy production and consumption efficiencies, particularly in energy-intensive industries, transport and power;

(g) To introduce the use of cleaner fuels;

(h) To consider developing renewable energy technologies and promoting their application, as appropriate.

2. Energy accessibility and poverty alleviation

18. Since 1992, energy services in most of the Arab countries have been increasingly extended to new groups of consumers. However, the average electrification rate in the region is still 79 per cent and is as low as 7.7 per cent in several countries. A high proportion of the rural and urban poor population are suffering from the lack of reliable modern fuel supplies. Therefore, there is a crucial need in the region for enhancing energy services accessibility to deal with rising poverty and facilitate economic development. Very limited resources are directed towards rural energy supplies, with the exception of a few regional and international cooperation projects for promoting renewable energy for rural areas.

3. Changing production and consumption patterns

19. In the field of energy efficiency, several Arab countries have adopted policies and programmes for encouraging energy conservation and efficiency in various economic sectors, particularly the residential, industrial, transport and electric power sectors. During the last few years, the Arab countries have directed efforts towards improving energy efficiency; and a number of major initiatives have been or are being implemented by different national organizations and institutes supported by regional and international organizations and institutes. The main results of such activities were the following:

(a) Energy audits were performed in many public and private industrial and residential facilities;

(b) Opportunities to improve the efficiency of thermal and electrical energy in industrial facilities now exist. The estimated potential achievable savings vary between 13 and 40 per cent of the total energy consumed by industry in the different countries;

(c) Programmes to improve energy efficiency were implemented, and have led to the training of large groups including high-level administration, engineers,

technicians and staff of energy service companies, and the development of a database in this area;

(d) Field projects were implemented in the residential, industrial and transport sectors.

20. The above-mentioned activities have resulted in a number of changes including a slight reduction in the growth rates of primary energy consumption, and improved efficiency of electric power plants and reduction in specific fuel consumption, as well as several codes of practice for efficient energy use in buildings and for energy appliances, in addition to energy labelling regulations.

21. In the field of renewable energy, apart from the use of solar water-heaters and photovoltaic small-scale applications, limited progress has been achieved in promoting the use of renewable energy technologies in the Arab countries. Large-scale wind farms are also currently in operation in some countries. However, ambitious targets are currently set by some countries in the region. In addition, some countries in the region have taken steps to install combined-cycle solar thermal power plants.

22. In the field of cleaner and advanced fossil fuel technologies, the last decade witnessed an increase in the share of natural gas in the energy mix of Arab countries, which reached 45.0 per cent of the total energy consumption in the region in 2001. Moreover, the installed capacity of the combined-cycle electricity generation plants using natural gas increased, reaching about 8,456 MW in 2001; and advances have been realized in the use of liquefied petroleum gas, compressed natural gas, unleaded gasoline and low-sulphur diesel. Meanwhile, the oil and gas sector has adopted the use of different advanced and clean fuel technologies in its operations. Measures adopted in the region to improve fuel qualities include:

(a) Upgrading the technologies of oil refineries, where increasing the capacity of treatment and conversion processes is an indicator of the potential of a refinery to produce high-quality fuels;

(b) Improving fuel specifications (using cleaner fossil fuel to reduce emissions);

(c) Switching to natural gas, wherever technically and economically feasible;

(d) Adopting vehicles inspection and maintenance programmes and upgrading the status of fleets.

23. Concerning the use of energy in transport, the share of transport in the Arab regions in primary energy consumption had attained a level of about 26.3 per cent by the end of 2003. This sector is one of the main sources of air quality degradation in major Arab cities and urbanized areas. A wide range of plans and measures to solve transportation problems have been adopted in many countries of the region. The main objectives of these plans are to reduce traffic jams in major cities, reduce air and noise pollution, save energy, and cut trip duration inside these cities. Most major cities have witnessed the creation of large-scale projects for developing modern transport infrastructure such as highways, new circular roads, bridges, tunnels, computerized traffic control, etc.

4. Cross-cutting issues

24. These activities and projects, which have resulted in considerable achievements, have also led to progress on different cross-cutting issues relevant to energy for sustainable development, particularly institution- and capacity-building, raising awareness, information-sharing and technology transfer in the field.

25. A number of meetings, seminars and workshops have been organized by United Nations and Arab regional organizations, with a view to improving stakeholder capacities and increasing awareness on issues such as private sector involvement, clean fuel and energy efficiency. As a result, some member countries have undertaken measures in this direction, including:

(a) Private sector involvement in the power sector;

(b) Development of a renewable energy strategy in rural areas;

(c) Building a pilot project on wind farms, policies for improving energy sector sustainability, and private sector involvement;

(d) Plans to introduce compressed gas technology for land transport;

(e) Private sector involvement in generation and management of power sector;

(f) Establishment of national energy efficiency programmes.

5. Regional cooperation projects

26. Numerous cooperation and integration projects have been undertaken by Arab countries in the field of energy, including joint projects to link electricity networks, and projects to establish oil and natural gas pipelines and networks. Notably, there are also numerous bilateral cooperation agreements in the production of energy equipment, development of the uses of renewable energy and rationalization of energy consumption.

27. Projects on electrical grid interconnection between the Arab countries have made considerable progress in recent years. A number of projects on subregional grid interconnection between Arab countries are at different stages of implementation and operation, namely, those involving:[12]

(a) Egypt, Jordan, the Syrian Arab Republic, Lebanon, Iraq, the Libyan Arab Jamahiriya and Turkey;

(b) Arab Maghreb countries (including a connection with Europe);

(c) Gulf Cooperation Council countries.

28. During the three past decades, the importance of natural gas in energy installations has increased, globally and regionally. A number of natural gas projects are at different stages of implementation and operation. These projects include:

(a) An Arab gas line between Egypt, Jordan, the Syrian Arab Republic and Lebanon (with future prospects of transferring gas to Cyprus, Turkey and Europe);

(b) The dolphin natural gas pipeline projects linking Qatar and the United Arab Emirates, with future extension to Oman);

(c) Natural gas projects involving Northern African Arab countries, and projects linking those countries and Europe.

29. From the example of the above-mentioned projects, it is evident that the Arab countries have achieved substantial progress in subregional electric connections, and in the natural gas network among Arab countries and with their neighbours.

6. Regional initiatives

30. A partnership on energy for sustainable development has already been established through the Council of Arab Ministers Responsible for the Environment (CAMRE) in close cooperation with concerned regional organizations, including the Organization of Arab Petroleum Exporting Countries, UNEP and ESCWA. Such organizations have initiated activities and achieved progress in this field and others through studies, inter alia, on energy, development and the environment undertaken to review and evaluate existing strategies, policies and experiences. The principal Arab declarations that have been issued with a view to expressing the concerns and commitments of the Arab countries in respect of the achievement of sustainable development are:

(a) The Abu Dhabi Declaration on the Future of Environmental Action in the Arab World (2001) (A/55/846, annex);

(b) The Arab Initiative for Sustainable Development (2002);

(c) The Abu Dhabi Declaration on Environment and Energy (2003);

(d) The Sana'a Statement on Renewable Energy and Sustainable Development (2004).

31. In the Abu Dhabi Declaration on Environment and Energy, the Arab Ministers of Energy and Ministers of Environment agreed on a broad framework of measures and programmes expressing their political will towards developing a more effective role of the energy sector in the achievement of sustainable development in the region, and emphasizing the following:

(a) The right of Arab countries to undertake the development and use of their energy resources, while securing oil and gas flows to international markets, particularly for countries depending on oil and gas revenues;

(b) The importance of achieving sustainable development and alleviating poverty in the region, through increasing access to affordable, reliable energy services, particularly for rural and remote areas, using a mix of available conventional and renewable energy resources;

(c) The need for developing national strategies for promoting the sustainability of the Arab energy sector;

(d) The importance of promoting regional energy integration projects, particularly electric grid interconnections and natural gas networks;

(e) The importance of calling on developed countries to adopt measures and programmes and provide financial resources to support developing countries in their programmes for achieving sustainable development, with particular emphasis on research and development (R&D), capacity-building and technology transfer.

32. In addition, since 2002, countries in the region have issued several rules, pieces of legislations and resolutions related to the conservation of the environment. Some of them addressed energy for sustainable development, such as the resolution adopted by the Supreme Council of the Gulf Cooperation Council at its twenty-fifth session (Manama, 20 and 21 December 2004). Meanwhile, some networking and cooperation mechanisms have been established to enhance regional cooperation on issues addressed by the Commission on Sustainable Development at its ninth session. The ESCWA regional promotional mechanism on energy systems for sustainable development was established in 2000 as a regional network of concerned authorities established to accelerate the development of and field application for such systems.

C. Challenges, opportunities and areas for future action[9]

33. The present section examines the challenges to be faced in the move towards achieving the objectives of energy for sustainable development in the Arab region and identifies opportunities and future actions for improving the contribution of the energy sector to achieving sustainable development in the region.

1. Challenges

34. For energy to be a means of supporting sustainable development, it is preferable to concentrate on delivering energy services that can meet the needs of the people, using a variety of technologies and fuels tailored to local conditions, rather than to simply work towards increasing energy supplies.

35. Several challenges are facing the Arab energy sector, which can be addressed mainly by:

(a) Responding to the rapidly increasing energy demand, due to rapid population growth, and the need to increase energy supplies so as to reach the approximately 21.4 per cent of populations that currently do not have access to electricity;

(b) Integrating sustainable energy strategies, plans and objectives within national development strategies, policies and plans, as well as integrating sectoral energy policies within national ones;

(c) Improving the economic management of the energy sector, since heavily subsidized energy tariffs have led to the reduction of the sector's revenues and limited the opportunities for the private investments needed to increase energy access to rural areas;

(d) Increasing the access of rural and remote areas to energy supplies, which is a prerequisite for poverty alleviation and economic and social development;

(e) Improving energy production and consumption efficiencies, with the goal of minimizing resources depletion and reducing environmental impacts;

(f) Upgrading institutional support, the marginal cooperation among stakeholders and the low level of awareness on the available technologies and technology transfers;

(g) Strengthening and promoting the currently limited regional and international cooperation on energy for sustainable development;

(h) Mobilizing funds for capacity-building, technology transfer and energy systems so as to meet increased energy demand;

(i) Improving data availability and consistency on relevant energy policies and systems.

2. Opportunities

36. In spite of the possible challenges to be faced in the course of achieving the targeted objectives, there are several opportunities for supporting the realization of the targeted objectives in moving towards energy systems for sustainable envelopment in the Arab region. For example:

(a) The focus of the Johannesburg Plan of Action on poverty alleviation and the development of sustainable energy patterns as being among the most central goals of sustainable development, will foster the inclusion of relevant energy needs and projects for poverty alleviation in the high-priority agenda at all levels — national, regional and international;

(b) The Johannesburg Plan of Implementation and the Commission on Sustainable Development in its follow-up on implementation have called on developed countries and funding agencies to support, to the maximum, developing countries in their efforts in the areas of research and development, technology transfer and capacity-building on energy for sustainable development, as well as to make funds available for such activities. This represents an opportunity for Arab countries to formulate project proposals and request both financial and technical support from developed countries, United Nations organizations and funding agencies on the basis of the two main considerations presented above;

(c) There are available international mechanisms for supporting technology transfer and capacity-building in the field, which can be utilized by Arab countries, such as the Clean Development Mechanism, the Global Environment Facility, official development assistance (ODA) and the New Partnership for Africa's Development (A/57/304, annex). The Partnership provides a good opportunity for Arab countries in Africa to obtain support for increasing energy access to rural poor areas;

(d) The fact that implemented energy activities in the Arab countries have helped create human expertise and local capabilities could be an incentive for supporting the efforts towards achieving energy for sustainable development. In addition, these efforts have fostered an environment within which the private sector can contribute to such efforts in this field;

(e) The available regional and subregional mechanisms, in relevant areas, can join forces in order to enhance regional cooperation in the field;

(f) The Arab regional integration projects on electricity grid interconnection, gas networking and energy industries, as discussed in this report, have a positive role to play in respect of achieving energy sector sustainability and promoting subregional and regional capacities in the field.

3. Priority areas for action

37. Four priority areas of actions have been identified based on the situation of the energy sector in the Arab countries, the concerns addressed by the Abu Dhabi Declaration on Energy and Environment, the urgent need to alleviate poverty and the extremely low energy accessibility in several Arab countries, particularly in Africa. These priority areas include:

(a) Poverty alleviation through enhancing access to modern energy services so as to foster economic and social development in rural and poor urban areas, in line with the Millennium Development Goal of reducing by half, between 1990 and 2015, the proportion of people living in extreme poverty;

(b) Improving energy production and consumption efficiencies in all sectors, particularly the sectors with the highest energy consumption, so as to enhance the economic return on energy consumption (that is to say, improve energy intensities);

(c) Diversification of energy resources used, in terms of conventional and renewable resources, as appropriate to countries' circumstances, and using locally available resources and expertise to secure affordable and environmentally sound energy services;

(d) Developing and increasing use of cleaner fuels and developing advanced fossil fuel technologies, particularly in the transport and power sectors, as well as enhancing oil and gas exploration activities.

38. Clearly, each of these priority areas has to be considered within the framework of energy resources and needs and the sector's status in each country.

III. Atmosphere/air pollution

39. The issue of air quality and atmospheric pollution in the Arab region has been addressed through consideration of the energy production and energy consumption pattern. Global, regional and local sources of air pollution in the region have been examined. The emission scenarios of many countries of the region have been outlined. Variable institutional capabilities for air pollution management and control still prevail among countries in the region.

40. Major types of pollution sources in the region such as dust storms and sandstorms, greenhouse gas emissions and other gases from various industries have been discussed. Local sources linked to urban growth, transportation systems, industrialization, and insufficient awareness and shortage of institutional capabilities also contribute to the relatively low quality of the air and inadequate control. The risk of radioactive contamination from old nuclear reactors in the region, and lack of contingency plans has not been taken into consideration. Examples of potential impacts of air pollution on the gross national product and potential impacts of climate change on various economic and health sectors have also been investigated and addressed to varying degrees among countries of the region.

41. Ground-based monitoring networks as well as capabilities of satellite monitoring systems have been considered and the needs for capacity-building on new air pollution monitoring and control techniques have also been addressed. The need for a shift in fuel strategy with particular emphasis on transportation systems,

industry and urban systems has been emphasized based on needs and priorities relevant to different countries in the region.

42. On the regional and local scales, priorities for action have been addressed for improving consumption patterns, upgrading air quality and promoting better governance and public participation for sustainable development.

A. Progress achieved

43. On national scales, there exists the realization that local anthropogenic air pollution implies inefficiency of energy utilization and consumption and economic losses. In addition, it is well understood that air pollution is responsible for some human health problems, and loss of environmental productivity. Nowadays, air quality is considered an indicator of the quality of life and sustainable development in many areas of the Arab region. As a result, air pollution control strategies have also been taken seriously in some countries of the Arab region, and important steps have been taken in this regard.

44. Efforts of international organizations to illustrate, identify, assess and study options for actions have been in progress for about two decades. Some success has been noted on the global scale. Unfortunately, the fact that regional and local efforts drastically lag behind in some member States requires immediate attention. This applies to the Arab region where efforts in developing institutional capability and technical support for air pollution control have been very limited.

45. Air pollution management requires capacity-building, ground-based monitoring systems and networks for proper operation and strategic decision support. It also requires accreditation, quality assurance and quality control, modelling tools and institutional capabilities for implementation. Such needs differ from one country to another in the region.

46. Most Arab States have already passed legislation to protect the environment. Numerous air quality standards have also been issued in conformity with international guidelines. In this regard, several Arab countries are monitoring and collecting air quality data in major cities and urban centres through the establishment of monitoring networks, and employing efficient pollution control measures. As a result of the adopting of programmes for cleaner energy, the employing of new and efficient technologies and the setting of environmental standards, improvements in air quality have been observed in the region.

B. Priority areas for further actions

47. There is a need to establish new, and improve existing, air pollution monitoring and control programmes for mobile and stationary emission sources, and to continue the assessment and analysis of ambient air data. Meteorological profiles of the atmosphere must be monitored on a reasonable scale to allow better interpretation of air pollution dispersion dynamics in urban areas, and hence the exercising of better control. It is necessary to use sound urban planning for cities with support systems that are environmentally sound and have low energy consumption. Cities should also use modern efficient traffic management systems to reduce traffic idle time, which produces peak emissions. It is also necessary to

continue efforts to phase out leaded gasoline, replace ageing vehicles and industrial production facilities, increase availability of cleaner fuel including natural gas stations and intensify forestation. It is also necessary to upgrade and update monitoring networks, data analysis and assessment, capacity-building and accreditation.

48. Joint programmes are needed to address common priorities of the countries in the region in the domain of air pollution monitoring and control, assessment of impacts associated with air pollution, and the exchange and dissemination of air pollution data. Developing subregional/regional air quality networks and a regional centre of excellence should be considered a matter of priority.

49. The international community is urged to provide technical and financial assistance to address the issue of air quality and atmospheric pollution, including transboundary air pollution.

IV. Climate change

50. Following ratification of the United Nations Framework Convention on Climate Change,[13] national climate change committees were established and some countries have started to monitor air quality and meteorological parameters. National inventories of greenhouse gases have been completed for several countries and work thereon is under way in others.[14]

A. General issues of concern

51. There are aspects of climatic circumstances including variations in rainfall and water resources that are specific to Arab countries. Most of the Arab countries are located in the arid and semi-arid zones where the climate is extremely hot and humid in the summertime, which is approximately between seven and nine months long. In most countries, during the summer, temperatures could exceed 50 degrees Celsius, and humidity exceeds 90 per cent in coastal areas. In addition, the region suffers most of the year from deficient precipitation which ranges from 50 to 150 millimetres (mm). The hot and humid climate requires extensive use of indoor air conditioning. In addition, the lack of precipitation and the scarcity of water resources, particularly in Gulf Cooperation Council countries, dictate the need for high desalination capacity. This has led to comparatively high rates of electricity consumption, and corresponding rates of carbon dioxide emissions. Greenhouse gas emissions vary widely among Arab countries, reflecting variability in energy consumption, levels of development, fuel mix and change in climatic conditions.

B. Greenhouse gas sink

52. Programmes of conservation, regeneration, reforestation and afforestation are being pursued in several Arab countries. Mitigation options are being considered for increasing carbon sequestration and storage. These options include afforestation as well as land use/land use and forestry, and rehabilitation of degraded forests. Coastal area management and carbon ocean storage, combating desertification,

reforestation, and biomass conservation projects are also being pursued nationally and subregionally.

C. Climate change impacts, vulnerability, adaptation, mitigation and response measures

53. In the energy sector, measures to mitigate greenhouse gas emissions cover the supply and demand sides. Measures on the supply side include, among others, energy efficiency in power generation, cogeneration, increasing transformation efficiency, modernization of electric utilities, fuel switching to fewer carbon-based fuels, electricity imports, reduction of losses in transmission and distribution, development of plans to promote rural electrification and use of renewable energy sources. Development projects have been pursued in some Arab countries in cooperation with industrialized countries under the Clean Development Mechanism. On the demand side, reporting countries have identified mitigation options in the industrial, residential, and commercial and transport sectors. The main reported measures have been related to enhancement of energy efficiency in lighting, cooling, cooking and air conditioning; implementation of demand-side management programmes; promotion of fuel switching; and use of renewable energy.

54. Energy efficiency measures have included improvements in building designs and the enforcement of building regulations. Other measures have included energy audits, and the use of energy efficiency labelling for appliances.

55. In the power generation sector, the switch from more-carbon-intensive fuels to natural gas, and the use of combined-cycle power plants, were the most commonly reported activities.

56. In the transport sector, measures envisioned by Arab countries would cover development of road transportation master plans, introduction of electric or compressed natural gas vehicles, improvement of the public transport systems, compliance with vehicle emission standards, and improvement of road infrastructure.

57. The Arab countries are likely to be affected by climate change. Climate change will have negative effects on the region in all sectors including agriculture, water resources, forestry, fishery, health, biodiversity, and human settlements, as indicated by the Intergovernmental Panel on Climate Change in its assessment reports.

58. Small island countries and those with low-line coastal areas in the Arab region are especially vulnerable to climate change and sea-level rise.

59. Many Arab countries, particularly oil producers, have experienced significant economic losses resulting from the implementation of climate change mitigation response measures by industrial countries in complying with their commitments under the United Nations Framework Convention on Climate Change and the Kyoto Protocol to the United Nations Framework Convention on Climate Change,[15] and have called for compensation for these losses in accordance with the provisions of the Framework Convention.

60. One of the most important constraints on the assessment of vulnerability and adaptation was the lack of capacities to conduct the type of vulnerability and

adaptation assessments that would generate reliable results for incorporation into national development planning processes.

D. Cross-cutting issues

1. Capacity-building

61. Arab countries have identified the extent of the involvement of academics and experts in the preparation of the reports of the Intergovernmental Panel on Climate Change and similar assessments. They have identified the technical and financial assistance and the means needed to strengthen capacity-building so as to fulfil the obligations and commitments under the United Nations Framework Convention on Climate Change, and the means needed to enhance scientific and technological capabilities for the exchange of scientific data and information. Most of them have indicated their needs for capacity-building in the collection, archiving and management of data needed for the preparation of national communications. In addition, a need was reported for enhancing existing methodologies and capacities to undertake integrated assessment of climate change impacts in different sectors (such as water resources, agriculture, human health, coastal zones, human settlements and biodiversity, etc.).

62. Support from the international community is required in building the needed institutional structures for better coherence of climate change policies with national policies and strategies. It should also provide enhanced assistance to national education systems in undertaking consideration of climate change at the primary, secondary and tertiary levels. Educational systems should encourage wider understanding and study of society/environment interactions, because there is a need for a better-informed public on the consequences and impacts of climate variability and change. The provision of financial assistance to some Arab countries, especially least developed countries, is urgently needed in the planning and implementation of response measures for adapting to the potential impacts of climate change. Developed countries are required to assist Arab countries on issues of technology transfer, and the selection of appropriate technologies.

63. Training activities are greatly needed in areas such as vulnerability and adaptation assessments, climate modelling and observations, and data management. There is also an urgent need to build the capacity to deal with the issues of land-use, land use change and forestry. Political support at the country level is essential, and Arab countries are encouraged to participate in the global activities related to disaster reduction and initiatives on global change research and systematic observations. In addition, oil exporting countries should cooperate in assessing further modelling work to determine, with less uncertainty, the magnitude of the impact on individual Arab economies of the response measures of developed countries.[16]

2. Technology transfer

64. There is a need in many Arab countries for technology transfer in different areas of climate change mitigation and adaptation. This is due to the lack of appropriate technologies, and research and development capabilities, and difficulties with technology transfer from developed countries.

65. Although the Global Environment Facility and other bilateral and multilateral donor organizations are mandated to facilitate the transfer of climate-friendly technologies to Arab countries, the international community should also support Arab countries and regional collaboration on climate change control and mitigation strategies.

E. Priority areas for actions

66. Many efforts are being exerted by countries of the Arab region towards mitigating climate change. However, these efforts need to be supported by the international community through actions including:

(a) Supporting Arab countries in their efforts to establish institutional capacities in the field of climate change;

(b) Supporting Arab countries in the environmental and economic impact assessment of climate change and the corresponding adaptation measures needed;

(c) Transferring environment-friendly technologies to the region;

(d) Supporting regional collaboration on climate change control and mitigation strategies and assisting them in joining the international efforts in this respect;

(e) Mitigating the impact of policies and measures adopted by the industrialized countries to comply with the United Nations Framework Convention on Climate Change and the Kyoto Protocol to the Convention and compensating the losses incurred by the Arab nations due to these measures.

V. Industrial development

A. Overview

67. Oil and gas resources play an important role in the economies of the Arab region as exports and as supporting inputs for the energy-intensive value-added industries that are proliferating in oil producing countries. Mining and processing of industrial minerals and metals, which have increased alongside fossil fuel extraction, are considered an important source of foreign currency in the region.

68. Countries with diversified economies continue to focus on traditional industries such as food processing and textiles. There has also been a gradual shift towards intermediate and oil-based industries in the oil producing countries, particularly chemicals, petrochemicals, fertilizers and plastics.[17] While this could signal the development of the sector and an increase in upstream linkages, concern remains regarding the potential environmental impacts of increased production in these new pollution-intensive activities. While the performances of the region's industry are mostly heterogeneous, few countries have been able to set up competitive industries that use modern technologies.

69. Industry in the Arab region has the following characteristics:[18]

(a) Concentration of Arab countries on extractive or primary processing of their raw materials rather than on manufacturing of end products. The opportunity to

raise value added from further processing of primary materials is substantial (for example, downstream petrochemicals, plastics, metal products, textile, etc.);

(b) Dominance of the capital goods industry which represents a viable sector in countries with diversified economies. However, these countries remain heavily dependent on imports of basic components as they concentrate on the local assembly of such goods;

(c) Poor export performance of manufactured goods and a high deficit in the trade balance. Export promotion policies may remedy this situation.

70. Considerable complementarities across countries of the region can be exploited to their advantage if industrial development strategies are coordinated in such a way as to encourage the comparative advantage of the individual countries while promoting the growth in intraregional trading.

71. Sustainable industrial development continues to face several challenges in the region. In many countries, these actions may include protection against competing imports, financial subsidies and discrimination in government procurement in favour of public sector industries. Such actions may hinder the shift towards cleaner industry.

B. Steering industrial development along a sustainable path

1. Cleaner production and industrial environmental management[19]

72. Arab industry is recognizing the need to avoid or minimize waste generation through the introduction of new cleaner production technologies. The public and private sectors currently regard pollution prevention as a dynamic concept that implies gradual development of technical expertise and enhanced management of environmental problems. This trend has resulted in progressive improvements in patterns of production and consumption, with an ultimate goal of achieving the sustainable development of Arab industry.

73. Few large-scale industries have introduced the concept of the life-cycle assessment. This approach encourages companies to work together to exchange waste for reprocessing in situations where prevention at source is either uneconomical or not technically feasible. Some countries are promoting the establishment of free trade zones, which, when placed within an enabling environment that encourages sound business practices, can attract new industries with modern technologies, as a means to improve productivity, as well as increase and diversify exports.

74. Most large-scale industries employ total recycling systems for cooling applications and multiple reuse of process water. Various desulphurization processes in oil refining achieve a reduction in the sulphur content of the crude oil, while providing an ample source of sulphur for fertilizers and other chemical industries.

75. Nevertheless, traditional macroeconomic policies and social attitudes obscure the benefits of, and act as a disincentive to, implementing cleaner production. Furthermore, the lack of capacity in financial institutions to evaluate the feasibility of cleaner production projects makes those institutions reluctant to fund such projects. Legislative and administrative mechanisms do not encourage the application of new cleaner production initiatives in industry. Despite the presence of

several national cleaner production centres in the Arab region, the fact that information is still inadequate has led industrialists to regard cleaner production technologies as costly systems that involve complex operations unsuitable to local conditions. Most entrepreneurs remain unconvinced that cleaner production could bring a direct benefit to their manufacturing operations.[20]

76. Despite these apparent obstacles, more sustainable business opportunities are anticipated in the long term. The perception of the environment will change: environmental concerns will be viewed not as a liability entailing monetary costs, but rather as a matter of integrating those concerns into business strategy and production processes. Both Governments and the business community should thus demonstrate their commitment to cleaner production by instituting a proper environmental policy that allocates personnel, time and financial support for environment-conscious processes and products.

77. Industrial environmental management is increasingly regarded in the region as an effective tool with which to improve production processes and materials and achieve efficient waste reduction, particularly in large-scale industries. While the system aims primarily at compliance with environmental regulations, it provides industrial managers with the proper means to improve production performance, product quality and competitiveness. In the new economic environment accompanying globalization, Arab countries are also enhancing their capacity in respect of standards, quality testing, certification and accreditation, including conformity with ISO 9000 and ISO 14000 management systems.[21]

2. Institutional measures to enhance industrial sustainability[22]

78. Institutional measures are being adopted to enhance industrial development. These include the revision and updating of national environmental action plans to include industrial sustainability. Recent emphasis has been placed on improving waste reprocessing and recycling practices in Arab industry. Waste recovery schemes for spent chemicals, solvents, acids, alkalis and heavy metals have been installed in locations where such constituents in industrial effluents are generated in large amounts. Some Arab countries have initiated plans to relocate pollution-intensive industries from urban areas to other locations away from the populated communities. Some Arab countries have also established cleaner production centres to provide technical assistance and training on environmentally sound technologies and proper management of waste.

79. Revision of environmental legislation has received increasing attention in recent years. There has also been advancement in the area of voluntary compliance. The use of economic instruments to encourage development and application of environmentally friendly measures has been integrated into the regulatory system of a few countries. The imposition of environmental taxes, fees and other financial measures are used to improve manufacturing practices and discourage waste generation. A recent trend towards imposing an environmental surcharge on some production processes that are potentially polluting (cigarette manufacturing, cement manufacturing, etc.) is a move in the right direction.

80. At present, most new enterprises are located in industrial cities. These cities are established in unpopulated locations where business can benefit from the efficient infrastructure of services. Procedures for accident prevention are adopted in most industry-intensive areas through employment of hazard control at source,

licensing and permit systems for emergency response, and proper zoning. Major industrial cities have established permanent committees for emergency preparedness in industrial areas, while the establishment of hazardous substances information and management systems is gaining momentum in some Arab countries.[23]

81. As pollution control standards have become more stringent, and the cost of freshwater has increased, industrial waste treatment has gained more attention. This situation is driving several water-intensive facilities to install advanced wastewater treatment systems that permit closing of the water cycle within plants with minimum feed from the municipal networks.

82. The shortage of skilled workers constitutes an important impediment to the sustainable development of the Arab manufacturing industry. Special attention is being given to the training of the enforcement and inspection personnel needed to enhance the awareness of the environmental impact of manufacturing operations and use the knowledge and experience gained to curb industrial pollution, as well as to foster the use of effective cleaner production options and the enforcement of appropriate regulations and administrative instructions.

83. Community participation in decisions concerning industry related to location and pollution prevention is accorded low priority in some Arab countries. There is a need for strengthening communication among government, industry and the local communities, and encouraging the exchange of views on industry actions that affect the welfare of citizens or pose public-health risks. Some Arab countries have implemented measures to help consumers identify environment-friendly products through eco-labelling. Eco-labels also act as a stimulus for application of cleaner production technologies in industry.[18]

84. The absence of effective land-use and industrial zoning regulations is creating health and environment risks in some urban areas. Encroachment of residential areas upon the safe boundary areas (buffer zones) is one cause of those health risks. To safeguard against health and environmental risks of industrial development, zoning and regional planning measures are being contemplated for industry-intensive areas in some Arab countries.

85. Since pollution remediation in industry relies on technological advances, obstacles in this regard also exist, including the fear exhibited by technical personnel and operators of dealing with unfamiliar waste treatment methods and technologies, and technological limitations in respect of new waste treatment processes and their impacts on production processes. There exist very few remediation projects for polluted soils in industrial and service locations (for example, those that are the site of oil, chemical, petrochemical and metallurgic industries, gas filling stations and military installations). Contaminated sites are commonly abandoned and left for use as dumping grounds that pose health risks.

C. Priority areas for actions

86. Building on technological advancements, Arab industry is positioned to abate pollution at reasonable cost and to integrate low-waste processes in their operations. However, this would require greater technology transfer and development of cleaner production technologies in the region, which could be realized with measures that promote:

(a) Private sector development in sustainable industries, and extend financial and technical support to small and medium-sized enterprises;

(b) Recovery and reutilization of waste, and establishing a national clearing house for waste exchange;

(c) Strategic interventions at the policy level to improve processes and products through adoption of the new approaches of life-cycle assessment, industrial environmental management, sustainable consumption, cleaner production, eco-labelling, and the instituting of innovative financing mechanisms to encourage private sector involvement;

(d) Voluntary initiatives to encourage the use of environmentally sound technologies, while enforcing compliance with emission standards;

(e) Research and development to improve industrial practices through development of environmentally sound technologies, and promote their application with due regard to cost-effectiveness;

(f) Integration of sustainable approaches in industry with similar efforts in the services, infrastructure and resource management sectors;

(g). Institution of a regional system for information network to act as a delivery mechanism for information concerning legislation, emissions standards, cleaner technologies, waste minimization and industrial environmental management;

(h) Public awareness and participation through increased flow of information from industry and government to the public and other stakeholders, and vice versa;

(i) Internal and external monitoring, self-monitoring and auditing schemes to support environmental enforcement and to enhance efforts for maintaining a clean environment for the benefit of workers and the surrounding communities.

Notes

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