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ENERGY POLICIES AND MEASURES FOR PROMOTING CLIMATE CHANGE MITIGATION IN ESCWA MEMBER COUNTRIES

GENERAL PERSPECTIVE ON CLIMATE CHANGE MITIGATION IN THE FIELD OF ENERGY

Summary

The climate change associated with emissions resulting from human activities is a global problem. The present document starts with an overview of the adverse effects of climate change, including threats to human security, in particular the environment, food, health, social and economic security, and the security of water and energy supplies; in addition to the potential rise of political and military conflict. It addresses the link between climate change and emissions, especially greenhouse gases and their increasing concentrations in the atmosphere. It also reviews the sources of those emissions and possible measures in the field of energy aimed at reducing emissions and enhancing climate change mitigation in ESCWA member countries. Such measures include increasing the reliance on renewable energy, namely wind and solar energy, and biomass energy from waste; using atomic energy to produce electricity and desalinate water; improving the efficiency of energy production and consumption; enhancing the sustainability of the transport sector; and adopting appropriate technologies for the achievement of the expected goals in the near future, such as capturing, transporting and storing carbon dioxide.

The present paper serves as an introduction to a further four documents which are submitted to the Committee on Energy at its eighth session, under the agenda item on energy policies and measures for promoting climate change mitigation in ESCWA member countries. It stresses that although the contribution of those countries to global emissions has been insignificant, their geographical extension, unequal social and economic structures, and the degradation of their natural resources make the ESCWA region one of the most vulnerable to climate change effects. As such, ESCWA countries shall have a vested interest in reducing emissions.

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Introduction

1. Given its detrimental effects on mankind, climate change is a common concern for all countries of the world. Despite reservations about climate change forecasts, particularly with regard to its timing, magnitude and regional patterns, there is widespread concern over the increasing concentrations of greenhouse gases in the atmosphere as a result of human activity, and over the rising temperature of the surface of the Earth as a result of such increase. A number of studies have been carried out on climate change, its adverse repercussions and its link to global warming; the growing concentrations of greenhouse gases in the atmosphere and their sources, primarily gases generated as a result of human activity.

I. POTENTIAL ADVERSE EFFECTS OF CLIMATE CHANGE

2. Although the ESCWA region has historically contributed as little as 3.58 per cent of global emissions in 2007 compared with 0.67 per cent only in 1971,[1] and despite the increase in energy consumption during the past few years as a result of growing needs for water desalination, refrigeration and air-conditioning given severe climatic conditions in the region, per capita contribution to carbon dioxide (CO_2) emissions in Arab countries has not exceeded the global average of 4.5 tons per year, compared with more than 20 tons per year in the United States of America.[2]

3. Nevertheless, the Arab region in general and the ESCWA region in particular will be among the regions which will suffer most from the effects of climate change on natural resources and living, economic and environmental conditions. Such effects include the following:

(a) A significant rise in the temperature of the Earth;

(b) Decreased soil moisture and increased evaporation;

(c) More frequent droughts, shortage of rainfall and scarcity of freshwater resources;

(d) Contraction of the snow on highlands;

(e) Increased desertification and land degradation, including reclaimed lands;

(f) Increased pressure on freshwater resources and growing needs for sea water desalination;

(g) Rising water levels in seas and oceans, and the sinking of a number of coastal areas, primarily in the Nile Delta and Bahrain;

(h) Degradation of the quality of groundwater due to the leakage of saline water from the sea;

(i) Emergence of problems in river navigation (in Egypt and the Sudan, for example);

(j) Adverse effects on biodiversity;

(k) Emergence of health problems among women, children, the elderly and the poor;

(l) Displacement and environmental migration in coastal areas;

(m) Increased likelihood of disasters, floods and hurricanes;

(n) Potential threats to public safety (such as Cyclone Gonu in Oman in 2007).

4. Those adverse repercussions will pose a number of threats to the security of the environment, energy and water supplies, food and health, and to social and economic security, including the following:

(a) A decrease in the production of energy from water sources;

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[1] International Energy Agency, 2007 statistical data. Available at: www.iea.org/stats/index.asp.

[2] United Nations Development Programme, 2007.

(b) An increased need for more energy consumption in order to meet refrigeration and air conditioning needs resulting from higher temperatures, and for additional investments in the production of desalinated water in order to address the shortage of freshwater resources;

(c) A decrease in the productivity of the agricultural sector, affecting the quantity of produced food, in addition to higher food prices, and threats to food and health security;

(d) Adverse repercussions on the tourism sector, as the number of tourists visiting areas affected by climate change is likely to decrease;

(e) Damage to the infrastructure of electricity generation, water production and oil extraction and refining facilities, and to urban areas in coastal regions in which water levels are likely to rise;

(f) Financial losses as a result of disasters caused by acute climate change;

(g) Financial costs associated with the movement of displaced persons from the affected coastal areas and desertified regions, and their resettlement in other locations;

(h) Rising unemployment rates which will increase poverty and undernourishment rates, and compromise social security.

5. On the political and security levels, there are fears of regional conflict over natural resources, in particular freshwater.

II. EMISSIONS AND GREENHOUSE GASES

6. The release of greenhouse gases and/or their precursors into the atmosphere is commonly known as emissions. Gaseous constituents of the atmosphere, which are released by both natural and anthropogenic sources and absorb and emit radiation within the thermal infrared range, are called greenhouse gases. They trap large quantities of thermal energy and increase the temperature of the Earth's circumference. It is important to examine such emissions in order to identify those released by the energy sector (including energy used for transport purposes) and determine the role that this sector can play in climate change mitigation.

7. Greenhouse gases listed in Annex A to the Kyoto Protocol to the United Nations Framework Convention on Climate Change (1992) are the following: CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), saturated perfluoro-carbons (PFCs) and sulfur hexafluoride (SF_6). The annex identifies a number of processes and sectors which release such emissions, including the energy sector which comprises fuel combustion (in transport, energy industries, manufacturing industries and construction, and others) and fugitive emissions from fuels; industrial processes; agriculture; and waste.

8. Although the source of most greenhouse gases is natural, their ratios in the atmosphere have increased over the past years as a result of a number of activities, including the following:

(a) Using fossil fuel for transport and to generate thermal, mechanical and electrical energy, where fuel combustion leads to the formation of CO_2. Researchers believe that the combustion of fossil fuel is responsible for up to 90 per cent of total CO_2 emissions;

(b) Some industries, such as the cement production, which are the source of an estimated 7 to 8 per cent of global CO_2 emissions, which is more than three times the emissions from civil aviation traffic (two per cent) and military activities.[3] Forty per cent of emissions from cement production are generated by energy consumption and 60 per cent by the disintegration of chemicals involved in the manufacturing process;

(c) Using fluorocarbon in refrigeration and air conditioning;

[3] See: webcache.googleusercontent.com.

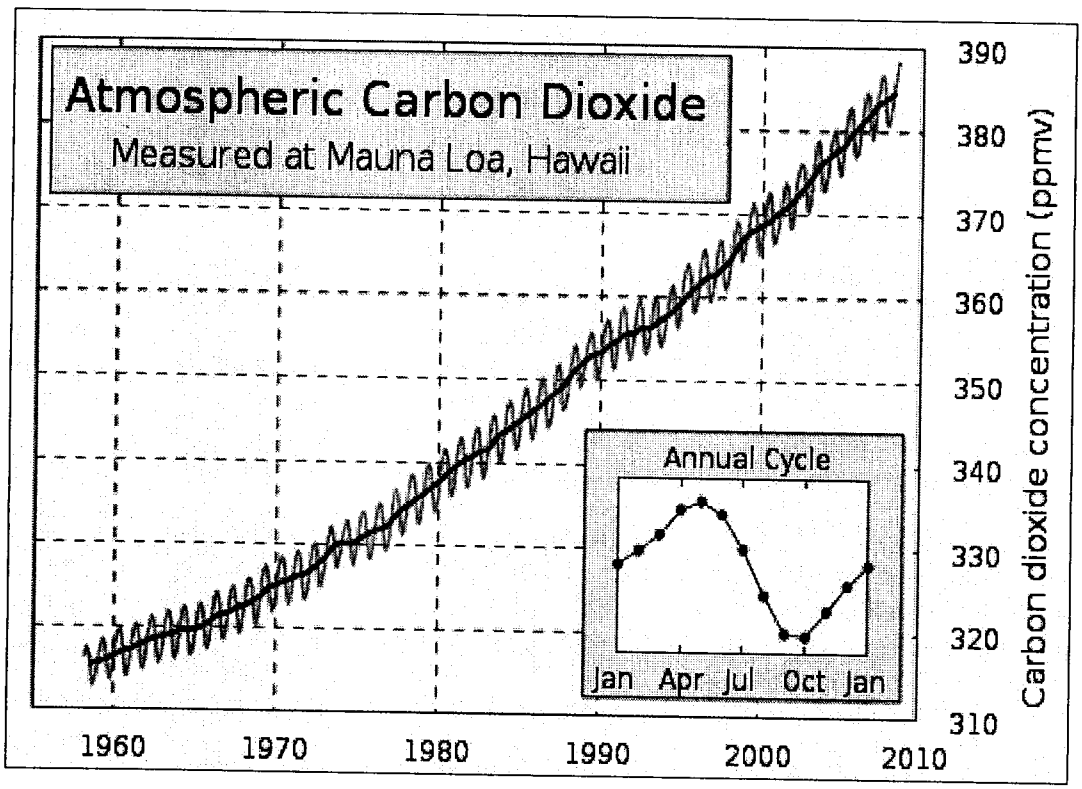
(d) Raising cattle and sheep;

(e) Accumulation of methane-releasing waste;

(f) Agriculture, such as rice cultivation, which releases methane; and the use of fertilizers which release N_2O.

9. While climate change is a complex phenomenon still subject to numerous research studies, the report of the tenth session Working Group I of the Intergovernmental Panel on Climate Change (IPCC) (Paris, 29 January – 1 February 2007) indicates that most of the observed increase in temperatures since the mid-twentieth century is "very likely" (more than 90 per cent probability) due to human activity. The concentrations of CO_2 in the atmosphere have increased from 280 parts per million (ppm) in the pre-industrial era to more than of 380 ppm today (figure I).

Figure I. Concentration of atmospheric carbon dioxide
(ppm)

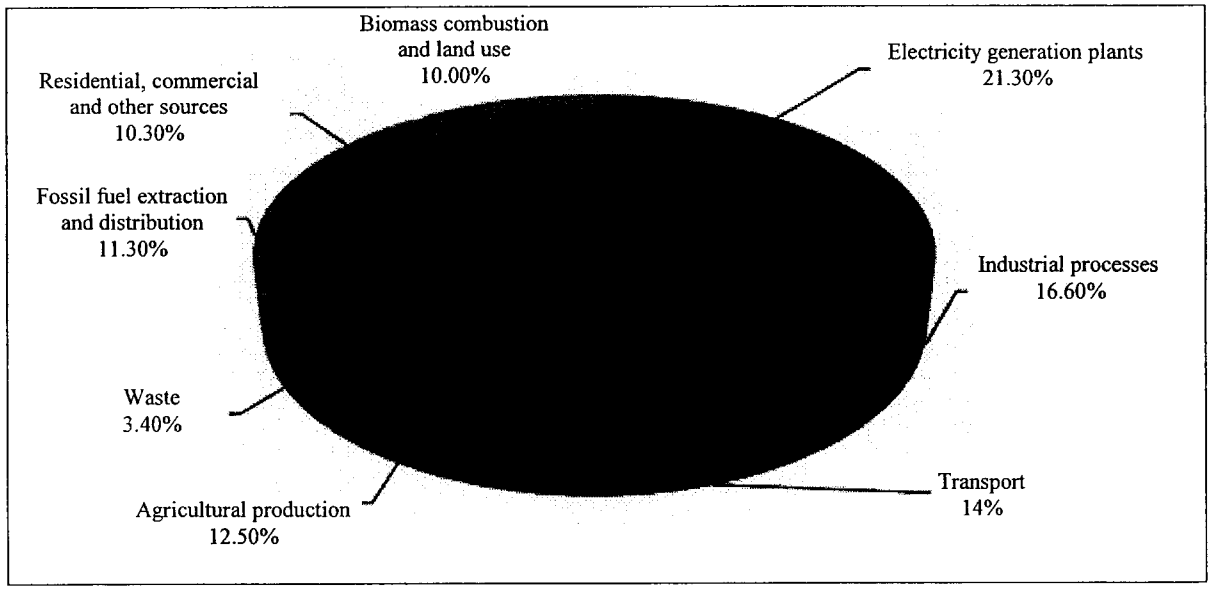


Source: The Mauna Loa Observatory in Hawaii.

10. Greenhouse gas concentrations are converted into units of CO_2 equivalent for the purpose of comparing the impact of each gas on climate change. Figure II shows the annual greenhouse gas emissions by sector weighted by their 100-year Global Warming Potentials (GWPs) which were determined by the IPCC[4] as follows: 1 for CO_2, 23-25 for CH_4, 310 for N_2O and 22,800 for sulfur hexafluoride (SF_6).

[4] IPCC, *Fourth Assessment Report*, table 2.14, chap. 2, p. 212. Available at: http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf.

Figure II. Annual greenhouse gas emissions by sector



Source: Wikipedia.

11. The actual contribution of CO_2 to global warming is 72 per cent and that of CH_4 is 18 per cent; the remaining 10 per cent is contributed by N_2O (9 per cent) and other gases (1 per cent). Ninety per cent of CO_2 emissions in the atmosphere are generated as a result of fossil fuel combustion and are thus directly associated with energy consumption.

12. In Lebanon, for example, the latest measure of greenhouse gas emissions indicated that 54.1 per cent of such emissions are generated by the energy sector, 21.5 per cent by the transport sector, 9.7 per cent by the manufacturing sector and 9.4 per cent by waste.

13. Researchers believe that if the two degrees Celsius ceiling of global warming is not to be breached, then global greenhouse gas concentration in the atmosphere must not exceed 450 ppm of CO_2 equivalents. A number of studies carried out by institutions in the European Union indicate that developed countries must reduce their emissions by 25-40 per cent by 2020 and by 80-95 per cent by 2050, compared with 1990 levels.[5]

14. While the Kyoto Protocol binds the States Parties listed in Annex B to the United Nations Framework Convention on Climate Change to achieve their quantified emission limitation and reduction commitments in the period 2008 to 2012 by their assigned percentage amounts of net anthropogenic CO_2 equivalent emissions, it states that all Parties, taking into account their common but differentiated responsibilities, shall formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change; such programmes would, inter alia, concern the energy, transport and industry sectors as well as agriculture, forestry and waste management (article 10 of the Protocol). The Protocol provides for the clean development mechanism (CDM) and states that its purpose shall be to assist Parties not included in Annex B in achieving sustainable development and in contributing to the ultimate objective of the Convention, provided that they benefit from project activities resulting in certified emission reductions.

[5] Available at: www.kepa.uoa.gr.

III. POLICIES AND MEASURES TO MITIGATE CLIMATE CHANGE BY REDUCING EMISSIONS

15. In order to reduce emissions, efforts should be made to achieve the following:

(a) Commitment to the Kyoto Protocol, which binds developed countries to reduce greenhouse gas emissions as specified in annex A thereof, and reach an agreement on new and additional commitments;

(b) Ending deforestation.

16. In the field of energy, in particular, policies must be devised and measures taken to reduce anthropogenic emissions, with a view to mitigating climate change. Such reduction will have other advantages, including the following: enhancing the efficiency of energy production and consumption; making economic savings; preserving the environment and public health, in addition to providing energy supplies and guaranteeing their security. To achieve those objectives, the following measures could be taken:

A. INCREASING THE RELIANCE ON RENEWABLE ENERGY SOURCES

17. Renewable energy sources include all kinds of energy which is generated in a natural and sustainable manner and which can be used by the human being without causing any significant damage to the environment. Those sources are the following:

(a) Hydro-energy, which is historically the most important source of commercial electric power;

(b) Wind energy, which can be used to produce mechanical energy and electric power;

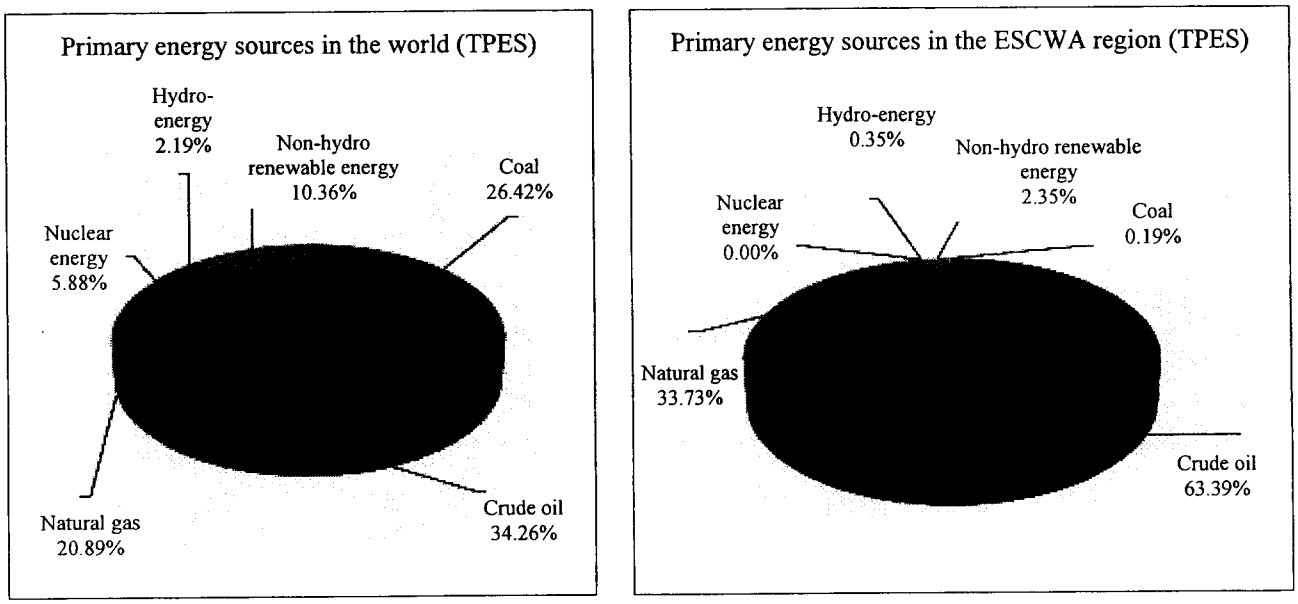
(c) Solar energy, which can be used to heat water. It is the most widespread application, given its economic feasibility and the ease of manufacturing and installation. It is used for heating by the active and passive systems, refrigeration, cooking, water pumping, sea water desalination and agriculture. It is also used for power generation by photovoltaic cells and solar concentrators. The use of photovoltaic cells has evolved historically to meet the needs of satellites and they have proved to be useful in locations far from electricity networks (public lighting, communications networks, and refrigerators for vaccine and immunization medicines in rural areas). Solar concentrators can generate high temperatures, which permits the production of water vapour for turbines used to generate electrical power to meet the needs of national networks. Document E/ESCWA/SDPD/2010/IG.1/4(Part II) addresses the production of electricity from renewable energy and is submitted to the Committee on Energy at its eighth session for discussion under the agenda item on energy policies and measures for promoting climate change mitigation in ESCWA member countries;

(d) Bioenergy, which includes biofuels produced by certain basic cultivations, such as cereal, sugar cane and sunflower. However, a number of experts in developing countries in general and Arab countries in particular caution against the expansion of such production at the expense of basic foodstuff, especially that irrigated and arable lands and labour in the agricultural sector are limited, which has adverse effects on food security. Specialists believe that it is justifiable for the European Union, Brazil and other countries that produce more food than they need, to produce biofuel from the surplus of agricultural crops. But both ESCWA and the Arab region, in which food shortage and importation constitute a dominant feature, will be adversely affected by any programme of biofuel production from agricultural crops, as they will increase the food import needs of those regions. The Arab Ministerial Declaration on Climate Change (Council of Arab Ministers Responsible for the Environment, nineteenth session, 5-6 December 2007) has warned against "the consequences of developed countries encouraging developing countries to cultivate agricultural crops that produce biofuel instead of food". The Declaration encouraged biofuel production from organic waste. In that context, document E/ESCWA/SDPD/2010/IG.1/4(Part IV) addresses energy production from waste and is

submitted to the Committee on Energy at its eighth session for discussion under the agenda item on energy policies and measures for promoting climate change mitigation in ESCWA member countries.

18. Greater efforts are required by member countries to increase reliance on renewable energy sources, as the ratio of renewable energy sources to primary energy in the ESCWA region did not exceed 2.7 per cent in 2008, compared with a global ratio of 12.55 per cent (figure III). Renewable energy applications play an important role in the provision of modern energy supplies to residents of remote villages in rural areas.

Figure III. Primary energy sources in the ESCWA region and the world



Source: IAEA, statistical data published in 2010.

B. USING ATOMIC ENERGY FOR ELECTRICITY PRODUCTION AND WATER DESALINATION

19. The Kuwait Declaration on "Elevating the Standard of Living for Arab citizens", which was issued at the Arab Economic, Social and Development Summit (Kuwait, 19-20 January 2009) calls for an increase in the use of nuclear energy techniques for peaceful purposes in production processes. Furthermore, at its eighth session held in Cairo on 20 May 2009, and upon examination of the Arab Strategy for Peaceful uses of Atomic Energy up to 2020 and the resolutions of the League of Arab States summit in Doha (twenty first regular session, 30-31 March 2009), the Arab Ministerial Council for Electricity mandated its secretariat to cooperate more fully with the Arab Atomic Energy Agency with a view to developing Arab human resources, by organizing capacity-building training sessions in the fields of energy planning, feasibility studies, regulatory and legislative frameworks, promulgation of national laws on nuclear matters, and examination of the vision of Arab countries on ways to establish and operate nuclear plants to generate electricity.

20. A number of Arab countries, in the ESCWA region in particular, have already established the necessary institutions, devised the required laws and programmes and undertaken the needed preparations. The United Arab Emirates has established the Emirates Nuclear Energy Corporation and has become a pioneer in that area. Less than a month after its inception, the Corporation announced the selection of a consortium, headed by Korea Electric Power Corporation (KEPCO), to design, build and help operate four light water nuclear reactors. The total capacity of the reactors amounts to 6,400 megawatts (MW), since each reactor has a capacity of 1,600 MW, and their total cost is approximately US $20 million. The reactors will be operated, concurrently, during the period 2017-2020. Their operation will not generate CO_2 or nitrogen oxide emissions and is considered to be one of the critical measures to mitigate climate change.

C. REDUCING ENERGY CONSUMPTION THROUGH A MORE RATIONAL AND EFFICIENT USE OF ENERGY

21. Measures to improve energy efficiency are less costly than those taken to reduce emissions, and programmes associated with those measures could be self-funded. A study published in 2008[6] revealed that the cost of saving a ton of oil equivalent through energy conservation measures is 40 euros on average, that is, less than the cost of buying a ton of oil equivalent at current prices. As a result, the demand on such measures is relatively higher than on the other climate change mitigation measures. Furthermore, should the complex and cross-cutting negotiations on climate change prove lengthy, there is an intention to reach a global agreement on energy efficiency entitled "The Cancun Energy Efficiency Agreement" at the United Nations Conference on Climate Change, which will be held in Cancun, Mexico, from 29 November to 10 December 2010. The United Nations Foundation is currently promoting that agreement.

22. In recent years, ESCWA issued a number of publications on energy efficiency in buildings, and in the tourism, industry and oil and gas extraction sectors. In 2007, the International Energy Agency (IEA) recommended the G8 countries to take 12 measures to improve energy efficiency. If applied, such measures could be sufficient to save 5,700 million tons of CO_2 emissions per year by 2030.

23. It is estimated that buildings are responsible for 30-40 per cent of emissions, which makes the focus on energy efficiency in that sector highly feasible. A study on energy efficiency in housing, which was presented at a workshop organized by the Economic Commission for Europe (Sofia, Bulgaria, 21-22 April 2009), indicated that the investment of one euro in the rehabilitation of buildings so as to reduce their energy consumption saves two euros in the energy production sector, according to European Union data. A number of measures can be taken to rationalize the use of energy, including designing buildings in line with environmentally friendly architectural designs, equipping them with thermal insulation and choosing appropriate colours for their facade. Other measures are related to the potential inhabitants of buildings, including raising their awareness of the importance of rationalizing energy use and improving technical skills of workers, and to the energy-consuming equipment, systems and tools. Following are examples of such measures:

(a) The replacement of incandescent lamps by energy-saving bulbs reduces lighting consumption by 70 per cent, bearing in mind that lighting represents 19 per cent of electricity consumption globally. A number of Arab countries have developed such programmes. Lebanon, for example, is distributing energy-saving lamps free of charge to consumers. In Egypt, electricity companies sell bulbs to consumers at discounted prices, by installments and guaranteed for 18 months; they also use such saving lamps for street lighting programmes;

(b) According to a study by the European Union, a sound selection of daily-used household electrical appliances, such as washing machines and refrigerators, according to certain specifications, saves 12 per cent of electricity consumption;

(c) Energy consumption by audio-visual appliances and computers used in homes, such as radios, televisions and the Internet, which amounts to 15 per cent of domestic consumption, could be halved by using a number of available techniques, according to a study by IEA.

24. Given that 90 per cent of CO_2 emissions are produced as a result of combustion processes, improving combustion efficiency is a fundamental tool that can be used to reduce emissions.

25. There is significant potential to improve energy efficiency in the process of producing electricity from fossil fuel combustion, which generates about 38 per cent of CO_2 emissions in member countries. In addition

[6] Blue Plan Notes, No. 10, November 2008.

to the need to reduce technical wastage in transmission and distribution networks, adopting a mixed circuit system in the production of electricity would increase returns to some 60 per cent. Most ESCWA countries still need to make significant efforts in that regard, as the less efficient production systems are the more emissions they will release. The following table shows emissions generated through the production of one kilowatt-hour (kWh) of electricity in ESCWA member countries.

CO_2 EMISSIONS PER KILOWATT-HOUR OF ELECTRICITY IN MEMBER COUNTRIES

Country	CO_2 emissions (gram/kWh of electricity)*	Percentage increase compared with Egypt
Bahrain	890.1	89
Egypt	471.5	----
Iraq	700.7	48
Jordan	660	40
Kuwait	807.5	71
Lebanon	667.3	42
Oman	854.5	81
Qatar	618	31
Saudi Arabia	747.6	58
The Sudan	848	80
Syrian Arab Republic	587.5	25
United Arab Emirates	843.6	79
Yemen	845.5	79

Source: United Nations Environment Programme (UNEP), *Greenhouse Gas Calculator*, 2009.

* Figures in the table indicate that certain countries produce electricity partially from renewable energy sources, such as Egypt, which produces electricity from 12 per cent of renewable sources only. Differences between emission levels in those countries are mainly due to the inefficiency of thermal production systems that are used.

26. The industrial sector plays an important role in improving energy efficiency and rationalizing energy consumption, since it is responsible for 22-33 per cent of emissions. Rationalization measures in that sector include the use of advanced technology, compliance with operation and maintenance instructions, use of energy audit programmes, waste heat recovery and improvement of the power factor.

D. REDUCING ENERGY CONSUMPTION IN THE TRANSPORT SECTOR

27. A number of simple measures can be taken by individuals to reduce emissions produced by the transport sector, which accounts for some 60 per cent of oil consumption globally. Such measures include refraining from excess vehicle speed; maintaining accurate air pressure in the car wheels; reducing movement in order to consume less fuel; and consuming locally produced materials. Other measures include adopting an integrated transport management, public transport and new fuel efficient technologies. IPCC and the UNEP believe that it is possible to reduce fuel consumption in the transport sector by 50 per cent. Document E/ESCWA/SDPD/2010/IG.1/4(Part III) addresses energy in the transport sector and is submitted to the Committee on Energy at its eighth session for discussion under the agenda item on energy policies and measures for promoting climate change mitigation in ESCWA member countries.

E. SHIFTING TOWARDS THE USE OF CLEANER FUELS/NATURAL GAS

28. Natural gas contains lower carbon and higher hydrogen proportions than other fuels. Arab countries own large reserves of the two types of natural gas, associated or not, which were estimated at about 30.3 per

cent of world reserves of natural gas at the end of 2008.[7] IEA statistics indicate that on average, the use of gas for the production of one kilowatt/hour of electricity and thermal energy generates 388 grams of CO_2, whereas the use of oil to produce the same amount of energy generates 662 grams of CO_2. That proves the advantage that ESCWA member countries shall have in shifting towards the use of natural gas.

F. CAPTURING, TRANSPORTING AND STORING CO_2

29. The capture, transportation and storage of CO_2 are promising technologies which are reliable and meet current needs, considering that, based on available facts, it is not possible to dispense entirely with combustion processes as a source for thermal energy, then mechanical energy and/or electrical energy, whether the fuel is fossil fuel, biomass fuel or bio-industrial fuel. Therefore, CO_2 capture and storage are expected to be an effective means to reduce emissions and thus mitigate climate change, and to offer a suitable solution for oil and gas producing countries, which could inject captured CO_2 in oil reservoirs to increase their productivity.

30. A number of programmes have been developed and large sums of money allocated for the capture and storage of CO_2. It is anticipated that US $600 billion will be invested worldwide in the period 2010-2030 for the implementation of such programmes, in the light of the decision by the G8 leaders, during their summit in Japan in 2008, to adopt measures and implement pilot projects in that area. Several CO_2 capture, transportation and storage projects have been implemented in different regions of the world (Australia, Canada, the European Union, Japan and the United States). Since 2004, Algeria has been implementing the In Salah Gas project in the Salah natural gas field in the central Sahara area of Algeria. Plans are also underway for a pilot project aimed at using CO_2 for enhanced oil recovery in Saudi Arabia. In 2009, during the World Future Energy Summit, Masdar (Abu Dhabi's initiative on renewable energy technologies) signed a memorandum of understanding with the Global Carbon Capture and Storage Institute founded by the Government of Australia and owned by its members, to become a founding member, with the objective of storing five million tons of CO_2 per year, as of the end of 2013, from three sources of emissions, namely a steel plant, an aluminum plant and an electricity generation plant. The captured gas will be transferred to the oil fields in Abu Dhabi and injected in wells to enhance their productivity.

31. IEA anticipates the prosperity of those techniques in the future and the establishment of 100 plants in 2020 and some 3,000 plants in 2050. It ranks CO_2 capture, transportation and storage the third most important technique (19 per cent) after energy conservation measures (24 per cent) and renewable energy applications (21 per cent).[8]

32. Four methods/technologies could be used to capture CO_2:

(a) Post-combustion capture which consists of using an organic liquid to separate CO_2 from oxygen, nitrogen and water vapour resulting from combustion, upon completion of the combustion process; it has become economically feasible in certain circumstances;

(b) Pre-combustion capture which consists of separating CO_2 from hydrogen and subsequently burning the hydrogen to produce thermal energy; it has become economically feasible in certain circumstances;

(c) Oxy-fuel process or oxy-combustion which consists of processing the quantities of air needed for combustion, by separating nitrogen from oxygen prior to the combustion process using the oxygen separated from nitrogen; it is currently at the experimental stage;

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[7] Statistics from the Organization of Arab Petroleum Exporting Countries (OAPEC).

[8] Sciences et Avenir, June 2010.

(d) Industrial separation which is used in industrial facilities and consists of adding raw materials to the mixture containing carbon so as to separate CO_2 and produce steel, ammonia and fertilizers concurrently; it has reached market maturity.

33. After it has been captured, CO_2 is transported either by pipelines, a method which has reached market maturity, or by tanks, which is economically feasible in certain circumstances.

34. Following transportation, CO_2 can be stored in oceans, an option which still requires further research, or in saline underground layers or in oil and gas wells, methods which are economically feasible in certain circumstances. CO_2 can be used to assist in the extraction of oil, a method which has reached market maturity. It can be converted into carbonates and waste, a method which is still at the experimental stage or used for industrial purposes, a method which has reached market maturity.

35. The CO_2 capture, storage and transport technology is likely to offer enormous opportunities to Arab oil-producing countries in the future, as an economic solution which can be used by the oil sector to contribute to climate change mitigation efforts. The relevant Arab authorities are aware of that fact and a number of Arab countries are making efforts in that regard. The Arab Ministerial Declaration on Climate Change, issued in 2007, called on the thirteenth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP-13, Bali, Indonesia, 3-15 December 2007) to develop and transfer CO_2 capture and storage technology and to adopt it in the CDM projects. At its twentieth session (Cairo, 21-22 December 2008), the Council of Arab Ministers Responsible for the Environment called on countries to follow up the adoption of a resolution on the use of the CO_2 capture and storage technology under CDM projects. The implementation of such a measure would ensure the global funding needed to carry out projects using that technology.

IV. SPECIAL STATUS OF ESCWA MEMBER COUNTRIES

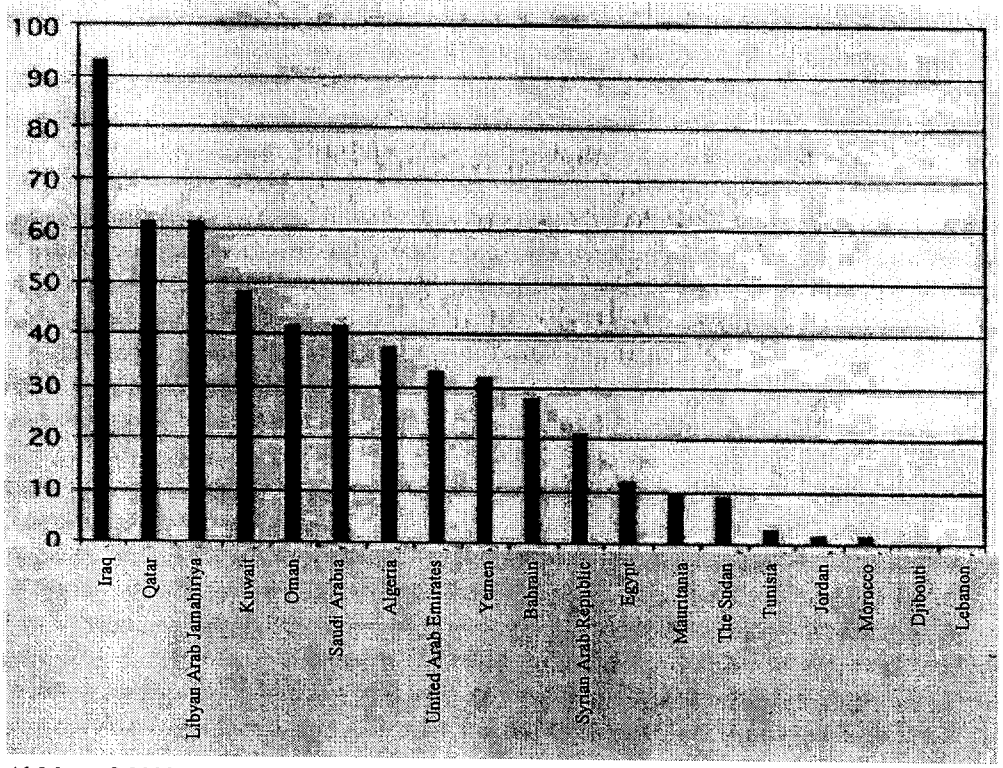
36. Although ESCWA member countries did not contribute to emissions in the past and contribute a small percentage only today, they take the shared responsibility for such emissions into account, and endeavor to develop policies and take action to reduce them.

37. That trend has been reflected in the Arab Ministerial Declaration on Climate Change, which affirmed the determination to develop programmes for climate change mitigation, in coordination and cooperation with all parties concerned, including scientific research centres, universities, civil society institutions and the private sector. The Declaration stated that such programmes shall focus on the production and use of cleaner fuels; improving energy efficiency in all sectors; diversifying energy sources; expanding the use of cleaner production and environmentally friendly technologies; and providing economic incentives to encourage the use of more efficient products. That trend has also been reflected in the decision of Arab countries participating in the Organization of Petroleum Exporting Countries Summit (OPEC) (Riyadh, December 2007) to create a US$ 750 million fund to support research on climate change.

38. In that regard, a number of developing countries face particular difficulties as a result of measures taken worldwide to reduce greenhouse gas emissions. It is estimated that those measures require additional investments representing annual expenditures of 1.6 per cent of the average gross world product until 2030, in order to stabilize CO_2 emissions at 450 ppm.[9] Developing countries, including ESCWA member countries, will suffer the most, as their economies rely heavily on fossil fuel production, use and exportation. As shown in figure IV, the contribution of the oil sector to the gross domestic product (GDP) exceeds 30 per cent in Iraq, Kuwait, Oman, Qatar, Saudi Arabia, the United Arab Emirates and Yemen.

[9] Draft Arab Framework Action Plan on Climate Change 2010-2020.

Figure IV. Contribution of the oil sector to GDP in Arab economies



Source: Al-Muneef, 2008.

39. Requirements for climate change mitigation need to be fully coordinated with economic and social development. The United Nations Framework Convention on Climate Change affirms that "responses to climate change should be coordinated with social and economic development in an integrated manner with a view to avoiding adverse impacts on the latter, taking into full account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty".

40. Scientific and technological advice, technology development and transfer, capacity-building and funding mechanisms are considered to be the main axes of action for the success of climate change mitigation efforts. The Global Environment Facility was entrusted to become the financial mechanism for the Convention and provide financial support to developing countries in order to develop a framework for technology transfer (COP-13). It is surprising, however, that ESCWA member countries and Arab countries in general have not benefited from CDM provided for under the Kyoto Protocol. According to data from the secretariat of the Convention, their share of the total projects under CDM has not exceeded one per cent (19 out of 1,946 projects in 2010).

41. Reducing emissions in ESCWA member countries through the use of new and renewable energy sources and improving the efficiency of energy production and consumption will spare large quantities of fossil fuel. Oil-producing countries will be able to export additional quantities and use the earnings to respond to development needs. Oil-importing countries will be able to reduce imports intended to cover their needs, which will improve their trade balance.

42. IEA statistics indicate that 5.7 per cent of the natural gas consumed in the world is used as raw material for petrochemical industries, fertilizers, and so on; that is why saving on oil and gas consumption as fuel sources permits to rely on them for longer periods in the future to meet the needs of those industries. Document E/ESCWA/SDPD/2010/IG.1/4(Part V) addresses regional and international cooperation and available opportunities, particularly in areas of technology, scientific advice, capacity building and financing, and is submitted to the Committee on Energy at its eighth session for discussion under the agenda item on energy policies and measures for promoting climate change mitigation in ESCWA member countries.
