

## **Previously Negotiated Language on Energy**

Agenda 21 (1992)

Rio + 5 (1997)

CSD-9 (2001)

Johannesburg Plan of  
Implementation (2002)

World Summit Outcome  
Document (2005)

## Agenda 21 (1992)

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### A) Encouraging greater efficiency in the use of energy and resources

4.18. Reducing the amount of energy and materials used per unit in the production of goods and services can contribute both to the alleviation of environmental stress and to greater economic and industrial productivity and competitiveness. Governments, in cooperation with industry, should therefore intensify efforts to use energy and resources in an economically efficient and environmentally sound manner by:

- a. Encouraging the dissemination of existing environmentally sound technologies;
- b. Promoting research and development in environmentally sound technologies;
- c. Assisting developing countries to use these technologies efficiently and to develop technologies suited to their particular circumstances;
- d. Encouraging the environmentally sound use of new and renewable sources of energy;
- e. Encouraging the environmentally sound and sustainable use of renewable natural resources.

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### E) Moving towards environmentally sound pricing

4.24. Without the stimulus of prices and market signals that make clear to producers and consumers the environmental costs of the consumption of energy, materials and natural resources and the generation of wastes, significant changes in consumption and production patterns seem unlikely to occur in the near future.

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5.3. The growth of world population and production combined with unsustainable consumption patterns places increasingly severe stress on the life-supporting capacities of our planet. These interactive processes affect the use of land, water, air, energy and other resources. Rapidly growing cities, unless well-managed, face major environmental problems. The increase in both the number and size of cities calls for greater attention to issues of local government and municipal management. The human dimensions are key elements to consider in this intricate set of relationships and they should be adequately taken into consideration in comprehensive policies for sustainable development. Such policies should address the linkages of demographic trends and factors, resource use, appropriate technology dissemination, and development. Population policy should also recognize the role played by human beings in environmental and development concerns. There is a need to increase awareness of this issue among decision

makers at all levels and to provide both better information on which to base national and international policies and a framework against which to interpret this information.

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E) Reducing health risks from environmental pollution and hazards

Basis for action

6.39. In many locations around the world the general environment (air, water and land), workplaces and even individual dwellings are so badly polluted that the health of hundreds of millions of people is adversely affected. This is, inter alia, due to past and present developments in consumption and production patterns and lifestyles, in energy production and use, in industry, in transportation etc., with little or no regard for environmental protection. There have been notable improvements in some countries, but deterioration of the environment continues. The ability of countries to tackle pollution and health problems is greatly restrained because of lack of resources. Pollution control and health protection measures have often not kept pace with economic development. Considerable development related environmental health hazards exist in the newly industrializing countries. Furthermore, the recent analysis of WHO has clearly established the interdependence among the factors of health, environment and development and has revealed that most countries are lacking such integration as would lead to an effective pollution control mechanism.<sup>2</sup> Without prejudice to such criteria as may be agreed upon by the international community, or to standards which will have to be determined nationally, it will be essential in all cases to consider the systems of values prevailing in each country and the extent of the applicability of standards that are valid for the most advanced countries but may be inappropriate and of unwarranted social cost for the developing countries.

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Activities

6.41. Nationally determined action programmes, with international assistance, support and coordination, where necessary, in this area should include:

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J) Industry and energy production:

- i Establish environmental health impact assessment procedures for the planning and development of new industries and energy facilities;
- ii Incorporate appropriate health risk analysis in all national programmes for pollution control and management, with particular emphasis on toxic compounds such as lead;
- iii Establish industrial hygiene programmes in all major industries for the surveillance of workers' exposure to health hazards;
- iv Promote the introduction of environmentally sound technologies within the industry and energy sectors;

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7.1. In industrialized countries, the consumption patterns of cities are severely stressing the global ecosystem, while settlements in the developing world need more raw material, energy, and economic development simply to overcome basic economic and social problems. Human settlement conditions in many parts of the world, particularly the developing countries, are deteriorating mainly as a result of the low levels of investment in the sector attributable to the overall resource constraints in these countries. In the low-income countries for which recent data are available, an average of only 5.6 per cent of central government expenditure went to housing, amenities, social security and welfare.<sup>1</sup> Expenditure by international support and finance organizations is equally low. For example, only 1 per cent of the United Nations system's total grant-financed expenditures in 1988 went to human settlements<sup>2</sup>, while in 1991, loans from the World Bank and the International Development Association (IDA) for urban development and water supply and sewerage amounted to 5.5 and 5.4 per cent, respectively, of their total lending.<sup>3</sup>

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#### Human settlement objective

7.4. The overall human settlement objective is to improve the social, economic and environmental quality of human settlements and the living and working environments of all people, in particular the urban and rural poor. Such improvement should be based on technical cooperation activities, partnerships among the public, private and community sectors and participation in the decision-making process by community groups and special interest groups such as women, indigenous people, the elderly and the disabled. These approaches should form the core principles of national settlement strategies. In developing these strategies, countries will need to set priorities among the eight programme areas in this chapter in accordance with their national plans and objectives, taking fully into account their social and cultural capabilities. Furthermore, countries should make appropriate provision to monitor the impact of their strategies on marginalized and disenfranchised groups, with particular reference to the needs of women.

7.5. The programme areas included in this chapter are:

- a. Providing adequate shelter for all;
- b. Improving human settlement management;
- c. Promoting sustainable land-use planning and management;
- d. Promoting the integrated provision of environmental infrastructure: water, sanitation, drainage and solid-waste management;
- e. Promoting sustainable energy and transport systems in human settlements;
- f. Promoting human settlement planning and management in disaster-prone areas;

- g. Promoting sustainable construction industry activities;
- h. Promoting human resource development and capacity-building for human settlement development.

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7.24. Developing countries should also encourage technological training and research through joint efforts by donors, non-governmental organizations and private business in such areas as the reduction of waste, water quality, saving of energy, safe production of chemicals and less polluting transportation.

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### **C. Promoting sustainable land-use planning and management**

#### **Basis for action**

7.27. Access to land resources is an essential component of sustainable low-impact lifestyles. Land resources are the basis for (human) living systems and provide soil, energy, water and the opportunity for all human activity. In rapidly growing urban areas, access to land is rendered increasingly difficult by the conflicting demands of industry, housing, commerce, agriculture, land tenure structures and the need for open spaces. Furthermore, the rising costs of urban land prevent the poor from gaining access to suitable land. In rural areas, unsustainable practices, such as the exploitation of marginal lands and the encroachment on forests and ecologically fragile areas by commercial interests and landless rural populations, result in environmental degradation, as well as in diminishing returns for impoverished rural settlers.

#### **Activities**

Developing countries should be assisted at the national and local levels in adopting an integrated approach to the provision of water supply, energy, sanitation, drainage and solid-waste management, and external funding agencies should ensure that this approach is applied in particular to environmental infrastructure improvement in informal settlements based on regulations and standards that take into account the living conditions and resources of the communities to be served.

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7.45. With the assistance and support of funding agencies, all countries should, as appropriate, undertake training and popular participation programmes aimed at:

### **E. Promoting sustainable energy and transport systems in human settlements**

#### **Basis for action**

7.46. Most of the commercial and non-commercial energy produced today is used in and for human settlements, and a substantial percentage of it is used by the household sector. Developing countries are at present faced with the need to increase their energy production to accelerate development and raise the living standards of their populations, while at the same time reducing energy production costs and energy -related pollution. Increasing the efficiency of energy use to reduce its polluting effects and to promote the use of renewable energies must be a priority in any action taken to protect the urban environment.

7.47. Developed countries, as the largest consumers of energy, are faced with the need for energy planning and management, promoting renewable and alternate sources of energy, and evaluating the life-cycle costs of current systems and practices as a result of which many metropolitan areas are suffering from pervasive air quality problems related to ozone, particulate matters and carbon monoxide. The causes have much to do with technological inadequacies and with an increasing fuel consumption generated by inefficiencies, high demographic and industrial concentrations and a rapid expansion in the number of motor vehicles.

7.48. Transport accounts for about 30 per cent of commercial energy consumption and for about 60 percent of total global consumption of liquid petroleum. In developing countries, rapid motorization and insufficient investments in urban-transport planning, traffic management and infrastructure, are creating increasing problems in terms of accidents and injury, health, noise, congestion and loss of productivity similar to those occurring in many developed countries. All of these problems have a severe impact on urban populations, particularly the low-income and no-income groups.

### **Objectives**

7.49. The objectives are to extend the provision of more energy-efficient technology and alternative/renewable energy for human settlements and to reduce negative impacts of energy production and use on human health and on the environment.

### **Activities**

7.50. The principal activities relevant to this programme area are included in chapter 9 (Protection of the atmosphere), programme area B, subprogramme 1 (Energy development, efficiency and consumption) and subprogramme 2 (Transportation).

7.51. A comprehensive approach to human settlements development should include the promotion of sustainable energy development in all countries, as follows:

- a. Developing countries, in particular, should:
  - i. Formulate national action programmes to promote and support reforestation and national forest regeneration with a view to achieving sustained provision of the biomass energy needs of the low-income groups in urban areas and the rural poor, in particular women and children;

- ii. Formulate national action programmes to promote integrated development of energy-saving and renewable energy technologies, particularly for the use of solar, hydro, wind and biomass sources;
  - iii. Promote wide dissemination and commercialization of renewable energy technologies through suitable measures, inter alia, fiscal and technology transfer mechanisms;
  - iv. Carry out information and training programmes directed at manufacturers and users in order to promote energy -saving techniques and energy-efficient appliances;
- b. International organizations and bilateral donors should:
- i. Support developing countries in implementing national energy programmes in order to achieve widespread use of energy-saving and renewable energy technologies, particularly the use of solar, wind, biomass and hydro sources;
  - ii. Provide access to research and development results to increase energy-use efficiency levels in human settlements.

7.52. Promoting efficient and environmentally sound urban transport systems in all countries should be a comprehensive approach to urban-transport planning and management. To this end, all countries should:

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- a. f. Re-evaluate the present consumption and production patterns in order to reduce the use of energy and national resources.

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### **Means of implementation**

7.54. In order to enhance the skills of energy service and transport professionals and institutions, all countries should, as appropriate:

- a. Provide on-the-job and other training of government officials, planners, traffic engineers and managers involved in the energy -service and transport section;
- b. Raise public awareness of the environmental impacts of transport and travel behaviour through mass media campaigns and support for non-governmental and community initiatives promoting the use of non-motorized transport, shared driving and improved traffic safety measures;

- c. Strengthen regional, national, state/provincial, and private sector institutions that provide education and training on energy service and urban transport planning and management.

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## **G. Promoting sustainable construction industry activities**

### **Activities**

7.69. All countries should, as appropriate and in accordance with national plans, objectives and priorities:

- a. Adopt standards and other regulatory measures which promote the increased use of energy-efficient designs and technologies and sustainable utilization of natural resources in an economically and environmentally appropriate way;

7.70. All countries should:

- b. Promote the development and dissemination of databases on the adverse environmental and health effects of building materials and introduce legislation and financial incentives to promote recycling of energy-intensive materials in the construction industry and conservation of waste energy in building-materials production methods;

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## **H. Promoting human resource development and capacity-building for human settlements development**

### **Basis for action**

7.75. Most countries, in addition to shortcomings in the availability of specialized expertise in the areas of housing, settlement management, land management, infrastructure, construction, energy, transport, and pre-disaster planning and reconstruction, face three cross-sectoral human resource development and capacity-building shortfalls. First is the absence of an enabling policy environment capable of integrating the resources and activities of the public sector, the private sector and the community, or social sector; second is the weakness of specialized training and research institutions; and third is the insufficient capacity for technical training and assistance for low-income communities, both urban and rural.

## **Agenda 21 – Chapter 8**

### **INTEGRATING ENVIRONMENT AND DEVELOPMENT IN DECISION-MAKING**

8.1. This chapter contains the following programme areas:

- a. Integrating environment and development at the policy, planning and management levels;

- b. Providing an effective legal and regulatory framework;
- c. Making effective use of economic instruments and market and other incentives;
- d. Establishing systems for integrated environmental and economic accounting.

## **PROGRAMME AREAS**

### **A. Integrating environment and development at the policy, planning and management levels**

#### **Basis for action**

8.2. Prevailing systems for decision-making in many countries tend to separate economic, social and environmental factors at the policy, planning and management levels. This influences the actions of all groups in society, including Governments, industry and individuals, and has important implications for the efficiency and sustainability of development. An adjustment or even a fundamental reshaping of decision-making, in the light of country-specific conditions, may be necessary if environment and development is to be put at the centre of economic and political decision-making, in effect achieving a full integration of these factors. In recent years, some Governments have also begun to make significant changes in the institutional structures of government in order to enable more systematic consideration of the environment when decisions are made on economic, social, fiscal, energy, agricultural, transportation, trade and other policies, as well as the implications of policies in these areas for the environment. New forms of dialogue are also being developed for achieving better integration among national and local government, industry, science, environmental groups and the public in the process of developing effective approaches to environment and development. The responsibility for bringing about changes lies with Governments in partnership with the private sector and local authorities, and in collaboration with national, regional and international organizations, including in particular UNEP, UNDP and the World Bank. Exchange of experience between countries can also be significant. National plans, goals and objectives, national rules, regulations and law, and the specific situation in which different countries are placed are the overall framework in which such integration takes place. In this context, it must be borne in mind that environmental standards may pose severe economic and social costs if they are uniformly applied in developing countries.

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#### **Activities**

##### **(a) Improving or reorienting governmental policies**

8.33. In particular, Governments should explore, in cooperation with business and industry, as appropriate, how effective use can be made of economic instruments and market mechanisms in the following areas:

- a. Issues related to energy, transportation, agriculture and forestry, water, wastes, health, tourism and tertiary services;

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## Agenda 21 – Chapter 9 PROTECTION OF THE ATMOSPHERE

### INTRODUCTION

9.5. The present chapter includes the following four programme areas:

- a. Addressing the uncertainties: improving the scientific basis for decision-making;
- b. Promoting sustainable development:
  - i. Energy development, efficiency and consumption;
  - ii. Transportation;
  - iii. Industrial development;
  - iv. Terrestrial and marine resource development and land use;
- c. Preventing stratospheric ozone depletion;
- d. Transboundary atmospheric pollution.

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### **B. Promoting sustainable development**

#### **1. Energy development, efficiency and consumption**

##### **Basis for action**

9.9. Energy is essential to economic and social development and improved quality of life. Much of the world's energy, however, is currently produced and consumed in ways that could not be sustained if technology were to remain constant and if overall quantities were to increase substantially. The need to control atmospheric emissions of greenhouse and other gases and substances will increasingly need to be based on efficiency in energy production, transmission, distribution and consumption, and on growing reliance on environmentally sound energy systems, particularly new and renewable sources of energy. 1/ All energy sources will need to be used in ways that respect the atmosphere, human health and the environment as a whole.

9.10. The existing constraints to increasing the environmentally sound energy supplies required for pursuing the path towards sustainable development, particularly in developing countries, need to be removed.

##### **Objectives**

9.11. The basic and ultimate objective of this programme area is to reduce adverse effects on the atmosphere from the energy sector by promoting policies or programmes, as appropriate, to increase the contribution of environmentally sound and cost-effective energy systems, particularly new and renewable ones, through less polluting and more efficient energy production, transmission, distribution and use. This objective should reflect the need for equity,

adequate energy supplies and increasing energy consumption in developing countries, and should take into consideration the situations of countries that are highly dependent on income generated from the production, processing and export, and/or consumption of fossil fuels and associated energy-intensive products and/or the use of fossil fuels for which countries have serious difficulties in switching to alternatives, and the situations of countries highly vulnerable to adverse effects of climate change.

### Activities

9.12. Governments at the appropriate level, with the cooperation of the relevant United Nations bodies and, as appropriate, intergovernmental and non-governmental organizations, and the private sector, should:

- a. Cooperate in identifying and developing economically viable, environmentally sound energy sources to promote the availability of increased energy supplies to support sustainable development efforts, in particular in developing countries;
- b. Promote the development at the national level of appropriate methodologies for making integrated energy, environment and economic policy decisions for sustainable development, inter alia, through environmental impact assessments;
- c. Promote the research, development, transfer and use of improved energy-efficient technologies and practices, including endogenous technologies in all relevant sectors, giving special attention to the rehabilitation and modernization of power systems, with particular attention to developing countries;
- d. Promote the research, development, transfer and use of technologies and practices for environmentally sound energy systems, including new and renewable energy systems, with particular attention to developing countries;
- e. Promote the development of institutional, scientific, planning and management capacities, particularly in developing countries, to develop, produce and use increasingly efficient and less polluting forms of energy;
- f. Review current energy supply mixes to determine how the contribution of environmentally sound energy systems as a whole, particularly new and renewable energy systems, could be increased in an economically efficient manner, taking into account respective countries' unique social, physical, economic and political characteristics, and examining and implementing, where appropriate, measures to overcome any barriers to their development and use;
- g. Coordinate energy plans regionally and subregionally, where applicable, and study the feasibility of efficient distribution of environmentally sound energy from new and renewable energy sources;

- h. In accordance with national socio-economic development and environment priorities, evaluate and, as appropriate, promote cost-effective policies or programmes, including administrative, social and economic measures, in order to improve energy efficiency;
- i. Build capacity for energy planning and programme management in energy efficiency, as well as for the development, introduction, and promotion of new and renewable sources of energy;
- j. Promote appropriate energy efficiency and emission standards or recommendations at the national level, 2/ aimed at the development and use of technologies that minimize adverse impacts on the environment;
- k. Encourage education and awareness-raising programmes at the local, national, subregional and regional levels concerning energy efficiency and environmentally sound energy systems;
- l. Establish or enhance, as appropriate, in cooperation with the private sector, labeling programmes for products to provide decision makers and consumers with information on opportunities for energy efficiency.

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### **3. Industrial development**

#### **Basis for action**

##### **Activities**

9.18. Governments at the appropriate level, with the cooperation of the relevant United Nations bodies and, as appropriate, intergovernmental and non-governmental organizations, and the private sector, should:

Encourage industry to increase and strengthen its capacity to develop technologies, products and processes that are safe, less polluting and make more efficient use of all resources and materials, including energy;

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- f. Support the promotion of less polluting and more efficient technologies and processes in industries, taking into account area-specific accessible potentials for energy, particularly safe and renewable sources of energy, with a view to limiting industrial pollution, and adverse impacts on the atmosphere.

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#### **Notes**

1/ New and renewable energy sources are solar thermal, solar photovoltaic, wind, hydro, biomass, geothermal, ocean, animal and human power, as referred to in the reports of the Committee on the Development and Utilization of New and Renewable Sources of Energy, prepared specifically for the Conference (see A/CONF.151/PC/119 and A/AC.218/1992/5).

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## Activities

### (a) Management-related activities

11.13. Governments should recognize the importance of categorizing forests, within the framework of long-term forest conservation and management policies, into different forest types and setting up sustainable units in every region/watershed with a view to securing the conservation of forests. Governments, with the participation of the private sector, non-governmental organizations, local community groups, indigenous people, women, local government units and the public at large, should act to maintain and expand the existing vegetative cover wherever ecologically, socially and economically feasible, through technical cooperation and other forms of support. Major activities to be considered include:

- a. Ensuring the sustainable management of all forest ecosystems and woodlands, through improved proper planning, management and timely implementation of silvicultural operations, including inventory and relevant research, as well as rehabilitation of degraded natural forests to restore productivity and environmental contributions, giving particular attention to human needs for economic and ecological services, wood-based energy, agroforestry, non-timber forest products and services, watershed and soil protection, wildlife management, and forest genetic resources;

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## Objectives

11.21. The objectives of this programme area are as follows:

- c. To promote more efficient and sustainable use of forests and trees for fuelwood and energy supplies;

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12.12. Governments at the appropriate level, with the support of the relevant international and regional organizations working on the issue of desertification and drought, should:

- c. Undertake and update existing inventories of natural resources, such as energy, water, soil, minerals, plant and animal access to food, as well as other resources, such as housing, employment, health, education and demographic distribution in time and space;

## Objectives

12.17. The objectives of this programme area are:

- d. To improve management of forest resources, including woodfuel, and to reduce woodfuel consumption through more efficient utilization, conservation and the enhancement, development and use of other sources of energy, including alternative sources of energy.

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## Activities

(a) Management-related activities

12.18. Governments at the appropriate level, and with the support of the relevant international and regional organizations, should:

- h. Promote the development and use of sources of energy which will lessen pressure on ligneous resources, including alternative sources of energy and improved stoves.

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## Agenda 21 – Chapter 13

### **MANAGING FRAGILE ECOSYSTEMS: SUSTAINABLE MOUNTAIN DEVELOPMENT**

13.1. Mountains are an important source of water, energy and biological diversity. Furthermore, they are a source of such key resources as minerals, forest products and agricultural products and of recreation. As a major ecosystem representing the complex and interrelated ecology of our planet, mountain environments are essential to the survival of the global ecosystem. Mountain ecosystems are, however, rapidly changing. They are susceptible to accelerated soil erosion, landslides and rapid loss of habitat and genetic diversity. On the human side, there is widespread poverty among mountain inhabitants and loss of indigenous knowledge. As a result, most global mountain areas are experiencing environmental degradation. Hence, the proper management of mountain resources and socio-economic development of the people deserves immediate action.

13.2. About 10 per cent of the world's population depends on mountain resources. A much larger percentage draws on other mountain resources, including and especially water. Mountains are a storehouse of biological diversity and endangered species.

13.3. Two programme areas are included in this chapter to further elaborate the problem of fragile ecosystems with regard to all mountains of the world. These are:

- a. Generating and strengthening knowledge about the ecology and sustainable development of mountain ecosystems;

- b. Promoting integrated watershed development and alternative livelihood opportunities.

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(c) Human resource development

13.22. Governments at the appropriate level, with the support of the relevant international and regional organizations, should:

- a. Promote a multidisciplinary and cross-sectoral approach in training and the dissemination of knowledge to local people on a wide range of issues, such as household production systems, conservation and utilization of arable and non-arable land, treatment of drainage lines and recharging of groundwater, livestock management, fisheries, agroforestry and horticulture;
- b. Develop human resources by providing access to education, health, energy and infrastructure;

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**Agenda 21 – Chapter 14**

**PROMOTING SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT**

14.4. The following programme areas are included in this chapter:

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- k. Rural energy transition to enhance productivity;

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**Activities**

(a) Management-related activities

14.18. Governments at the appropriate level, with the support of the relevant international and regional organizations, should:

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- f. Provide support services and training, recognizing the variation in agricultural circumstances and practices by location; the optimal use of on-farm inputs and the minimal use of external inputs; optimal use of local natural resources and management of renewable energy sources; and

the establishment of networks that deal with the exchange of information on alternative forms of agriculture.

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## **J. Sustainable plant nutrition to increase food production**

### **Basis for action**

14.83. In many developing countries, population growth rates exceed 3 per cent a year, and national agricultural production has fallen behind food demand. In these countries the goal should be to increase agricultural production by at least 4 per cent a year, without destroying the soil fertility. This will require increasing agricultural production in high-potential areas through efficiency in the use of inputs. Trained labour, energy supply, adapted tools and technologies, plant nutrients and soil enrichment will all be essential.

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## **K. Rural energy transition to enhance productivity**

### **Basis for action**

14.92. Energy supplies in many countries are not commensurate with their development needs and are highly priced and unstable. In rural areas of the developing countries, the chief sources of energy are fuelwood, crop residues and manure, together with animal and human energy. More intensive energy inputs are required for increased productivity of human labour and for income-generation. To this end, rural energy policies and technologies should promote a mix of cost-effective fossil and renewable energy sources that is itself sustainable and ensures sustainable agricultural development. Rural areas provide energy supplies in the form of wood. The full potential of agriculture and agroforestry, as well as common property resources, as sources of renewable energy, is far from being realized. The attainment of sustainable rural development is intimately linked with energy demand and supply patterns. 5/

### **Objectives**

14.93. The objectives of this programme area are:

- a. Not later than the year 2000, to initiate and encourage a process of environmentally sound energy transition in rural communities, from unsustainable energy sources, to structured and diversified energy sources by making available alternative new and renewable sources of energy;
- b. To increase the energy inputs available for rural household and agro-industrial needs through planning and appropriate technology transfer and development;
- c. To implement self-reliant rural programmes favouring sustainable development of renewable energy sources and improved energy efficiency.

## Activities

### (a) Management-related activities

14.94. Governments at the appropriate level, with the support of the relevant international and regional organizations, should:

- a. Promote pilot plans and projects consisting of electrical, mechanical and thermal power (gasifiers, biomass, solar driers, wind-pumps and combustion systems) that are appropriate and likely to be adequately maintained;
- b. Initiate and promote rural energy programmes supported by technical training, banking and related infrastructure;
- c. Intensify research and the development, diversification and conservation of energy, taking into account the need for efficient use and environmentally sound technology.

### (b) Data and information

14.95. Governments at the appropriate level, with the support of the relevant international and regional organizations, should:

- a. Collect and disseminate data on rural energy supply and demand patterns related to energy needs for households, agriculture and agro-industry;
- b. Analyse sectoral energy and production data in order to identify rural energy requirements.

### (c) International and regional cooperation and coordination

14.96. The appropriate United Nations agencies and regional organizations should, drawing on the experience and available information of non-governmental organizations in this field, exchange country and regional experience on rural energy planning methodologies in order to promote efficient planning and select cost-effective technologies.

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## Means of implementation

### (a) Financing and cost evaluation

14.98. Governments at the appropriate level, with the support of the relevant international and regional organizations, should:

- a. Intensify public and private sector research in developing and industrialized countries on renewable sources of energy for agriculture;
- b. Undertake research and transfer of energy technologies in biomass and solar energy to agricultural production and post-harvest activities.

(c) Human resource development

14.99. Governments at the appropriate level, with the support of the relevant international and regional organizations, should enhance public awareness of rural energy problems, stressing the economic and environmental advantages of renewable energy sources.

(d) Capacity-building

14.100. Governments at the appropriate level, with the support of the relevant international and regional organizations, should:

- a. Establish national institutional mechanisms for rural energy planning and management that would improve efficiency in agricultural productivity and reach the village and household level;
- b. Strengthen extension services and local organizations to implement plans and programmes for new and renewable sources of energy at the village level.

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## **C. Enhancing protection of the environment**

### **Basis for action**

16.20. Environmental protection is an integral component of sustainable development. The environment is threatened in all its biotic and abiotic components: animals, plants, microbes and ecosystems comprising biological diversity; water, soil and air, which form the physical components of habitats and ecosystems; and all the interactions between the components of biodiversity and their sustaining habitats and ecosystems. With the continued increase in the use of chemicals, energy and nonrenewable resources by an expanding global population, associated environmental problems will also increase. Despite increasing efforts to prevent waste accumulation and to promote recycling, the amount of environmental damage caused by overconsumption, the quantities of waste generated and the degree of unsustainable land use appear likely to continue growing.

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### **Objectives**

16.22. The aim of this programme is to prevent, halt and reverse environmental degradation through the appropriate use of biotechnology in conjunction with other technologies, while supporting safety procedures as an integral component of the programme. Specific objectives include the inauguration as soon as possible of specific programmes with specific targets:

- a. To adopt production processes making optimal use of natural resources, by recycling biomass, recovering energy and minimizing waste generation;

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### **Activities**

#### (a) Management-related activities

16.23. Governments at the appropriate level, with the support of relevant international and regional organizations, the private sector, non-governmental organizations and academic and scientific institutions, should:

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- d. Develop processes to recover energy and provide renewable energy sources, animal feed and raw materials from recycling organic waste and biomass;

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## **D. Sustainable use and conservation of marine living resources under national jurisdiction**

### **Basis for action**

17.72. Problems extend beyond fisheries. Coral reefs and other marine and coastal habitats, such as mangroves and estuaries, are among the most highly diverse, integrated and productive of the Earth's ecosystems. They often serve important ecological functions, provide coastal protection, and are critical resources for food, energy, tourism and economic development. In many parts of the world, such marine and coastal systems are under stress or are threatened from a variety of sources, both human and natural.

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### **Means of implementation**

#### (b) Scientific and technological means

21.14. Waste minimization technologies and procedures will need to be identified and widely disseminated. This work should be coordinated by national Governments, with the cooperation and collaboration of non-governmental organizations, research institutions and appropriate organizations of the United Nations, and could include the following:

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f. Facilitating the transfer of waste-reduction technologies to industry, particularly in developing countries, and establishing concrete national standards for effluents and solid waste, taking into account, inter alia, raw material use and energy consumption.

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### **Activities**

#### **(a) Management-related activities**

21.19. Governments and institutions and non-governmental organizations, including consumer, women's and youth groups, in collaboration with appropriate organizations of the United Nations system, should launch programmes to demonstrate and make operational enhanced waste reuse and recycling. These programmes should, wherever possible, build upon existing or planned activities and should:

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d. Modify existing standards or purchase specifications to avoid discrimination against recycled materials, taking into account the saving in energy and raw materials;

#### **(b) Data and information**

21.20. Information and research is required to identify promising socially acceptable and cost-effective forms of waste reuse and recycling relevant to each country. For example, supporting activities undertaken by national and local governments in collaboration with the United Nations and other international organizations could include:

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c. Increasing funding for research pilot programmes to test various options for reuse and recycling, including the use of small-scale, cottage-based recycling industries; compost production; treated waste-water irrigation; and energy recovery from wastes;

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## **PROGRAMME AREAS**

### **A. Promoting cleaner production**

#### **Objectives**

30.6. Governments, business and industry, including transnational corporations, should aim to increase the efficiency of resource utilization, including increasing the reuse and recycling of residues, and to reduce the quantity of waste discharge per unit of economic output.

...

### Activities

30.10. Business and industry, including transnational corporations, should be encouraged:

- a. To report annually on their environmental records, as well as on their use of energy and natural resources;

...

### Objectives

32.5. The following objectives are proposed:

- d. To introduce or strengthen policies that would encourage self-sufficiency in low-input and low-energy technologies, including indigenous practices, and pricing mechanisms that internalize environmental costs;

...

32.12. Governments and appropriate international organizations, in collaboration with national research organizations and non-governmental organizations should, as appropriate:

- a. Develop environmentally sound farming technologies that enhance crop yields, maintain land quality, recycle nutrients, conserve water and energy and control pests and weeds;

...

### ACTIVITIES

34.15. Existing national, subregional, regional and international information systems should be developed and linked through regional clearing-houses covering broad-based sectors of the economy such as agriculture, industry and energy. Such a network might, inter alia, include national, subregional and regional patent offices that are equipped to produce reports on state-of-the-art technology. The clearing-house networks would disseminate information on available technologies, their sources, their environmental risks, and the broad terms under which they may be acquired. They would operate on an information-demand basis and focus on the information needs of the end-users. They would take into account the positive roles and contributions of international, regional and subregional organizations, business communities, trade associations, non-governmental organizations, national Governments, and newly established or strengthened national networks.

34.16. The international and regional clearing-houses would take the initiative, where necessary, in helping users to identify their needs and in disseminating information that meets those needs,

including the use of existing news, public information, and communication systems. The disseminated information would highlight and detail concrete cases where environmentally sound technologies were successfully developed and implemented. In order to be effective, the clearinghouses need to provide not only information, but also referrals to other services, including sources of advice, training, technologies and technology assessment. The clearinghouses would thus facilitate the establishment of joint ventures and partnerships of various kinds.

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## **Agenda 21 – Chapter 35**

### **SCIENCE FOR SUSTAINABLE DEVELOPMENT**

35.2. Scientists are improving their understanding in areas such as climatic change, growth in rates of resource consumption, demographic trends, and environmental degradation. Changes in those and other areas need to be taken into account in working out long-term strategies for development. A first step towards improving the scientific basis for these strategies is a better understanding of land, oceans, atmosphere and their interlocking water, nutrient and biogeochemical cycles and energy flows which all form part of the Earth system. This is essential if a more accurate estimate is to be provided of the carrying capacity of the planet Earth and of its resilience under the many stresses placed upon it by human activities. The sciences can provide this understanding through increased research into the underlying ecological processes and through the application of modern, effective and efficient tools that are now available, such as remote-sensing devices, robotic monitoring instruments and computing and modelling capabilities. The sciences are playing an important role in linking the fundamental significance of the Earth system as life support to appropriate strategies for development which build on its continued functioning. The sciences should continue to play an increasing role in providing for an improvement in the efficiency of resource utilization and in finding new development practices, resources, and alternatives. There is a need for the sciences constantly to reassess and promote less intensive trends in resource utilization, including less intensive utilization of energy in industry, agriculture, and transportation. Thus, the sciences are increasingly being understood as an essential component in the search for feasible pathways towards sustainable development.

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#### **B. Enhancing scientific understanding Basis for action**

35.10. In order to promote sustainable development, more extensive knowledge is required of the Earth's carrying capacity, including the processes that could either impair or enhance its ability to support life. The global environment is changing more rapidly than at any time in recent centuries; as a result, surprises may be expected, and the next century could see significant environmental changes. At the same time, the human consumption of energy, water and non-renewable resources is increasing, on both a total and a per capita basis, and shortages may ensue in many parts of the world even if environmental conditions were to remain unchanged. Social processes are subject to multiple variations across time and space, regions and culture. They both

affect and are influenced by changing environmental conditions. Human factors are key driving forces in these intricate sets of relationships and exert their influence directly on global change. Therefore, study of the human dimensions of the causes and consequences of environmental change and of more sustainable development paths is essential.

### **Activities**

- a. Coordinate existing data- and statistics-gathering systems relevant to developmental and environmental issues so as to support preparation of long-term scientific assessments – for example, data on resource depletion, import/export flows, energy use, health impacts and demographic trends; apply the data obtained through the activities identified in programme area B to environment/development assessments at the global, regional and local levels; and promote the wide distribution of the assessments in a form that is responsive to public needs and can be widely understood;

...

### **Activities**

#### **A. Review, assessment and fields of action in international law for sustainable development**

39.7. In view of the vital necessity of ensuring safe and environmentally sound nuclear power, and in order to strengthen international cooperation in this field, efforts should be made to conclude the ongoing negotiations for a nuclear safety convention in the framework of the International Atomic Energy Agency.

## Rio+5 (1997)

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10. While there has been progress in material and energy efficiency, particularly with reference to non-renewable resources, overall trends remain unsustainable. As a result, increasing levels of pollution threaten to exceed the capacity of the global environment to absorb them, increasing the potential obstacles to economic and social development in developing countries.

...

24. Sustainable development strategies are important mechanisms for enhancing and linking national capacity so as to bring together priorities in social, economic and environmental policies. Hence, special attention must be given to the fulfilment of commitments in the areas set out below, in the framework of an integrated approach towards development, consisting of mutually reinforcing measures to sustain economic growth, as well as to promote social development and environmental protection. Achieving sustainable development cannot be carried out without greater integration at all policy-making levels and at operational levels, including the lowest administrative levels possible. Economic sectors, such as industry, agriculture, energy, transport and tourism, must take responsibility for the impact of their activities on human well-being and the physical environment. In the context of good governance, properly constructed strategies can enhance prospects for economic growth and employment and at the same time protect the environment.

...

### Changing consumption and production patterns

28. Unsustainable patterns of production and consumption, particularly in the industrialized countries, are identified in Agenda 21 as the major cause of continued deterioration of the global environment. While unsustainable patterns in the industrialized countries continue to aggravate the threats to the environment, there remain huge difficulties for developing countries in meeting basic needs such as food, health care, shelter and education for people. All countries should strive to promote sustainable consumption patterns; developed countries should take the lead in achieving sustainable consumption patterns; developing countries should seek to achieve sustainable consumption patterns in their development process, guaranteeing the provision of basic needs for the poor, while avoiding those unsustainable patterns, particularly in industrialized countries, generally recognized as unduly hazardous to the environment, inefficient and wasteful, in their development processes. This requires enhanced technological and other assistance from industrialized countries. In the follow-up of the implementation of Agenda 21, the review of progress made in achieving sustainable consumption patterns should be given high priority. Consistent with Agenda 21, the development and further elaboration of national policies and strategies, particularly in industrialized countries, are needed to encourage changes in unsustainable consumption and production patterns, while strengthening, as appropriate, international approaches and policies that promote sustainable consumption patterns

on the basis of the principle of common but differentiated responsibilities, applying the polluter pays principle, and encouraging producer responsibility and greater consumer awareness. Eco-efficiency, cost internalization and product policies are also important tools for making consumption and production patterns more sustainable. Actions in this area should focus on:

...

f. Promoting international and national programmes for energy and material efficiency with timetables for their implementation, as appropriate. In this regard, attention should be given to studies that propose to improve the efficiency of resource use, including consideration of a 10-fold improvement in resource productivity in industrialized countries in the long term and a possible factor-four increase in industrialized countries in the next two or three decades. Further research is required to study the feasibility of these goals and the practical measures needed for their implementation. Industrialized countries will have a special responsibility and must take the lead in this respect. The Commission on Sustainable Development should consider this initiative in the coming years in exploring policies and measures necessary to implement eco-efficiency and, for this purpose, encourage the relevant bodies to adopt measures aimed at assisting developing countries in improving energy and material efficiency through the promotion of their endogenous capacity-building and economic development with enhanced and effective international support;

...

33. The present section identifies a number of specific areas that are of widespread concern since failure to reverse current trends in these areas, notably in resource degradation, will have potentially disastrous effects on social and economic development, on human health and on environmental protection for all countries, particularly developing countries. All sectors covered by Agenda 21 are equally important and thus deserve attention by the international community on an equal footing. The need for integration is important in all sectors, including the areas of energy and transport because of the adverse effects that developments in those areas can have on human health and ecosystems; the areas of agriculture and water use, where inadequate land-use planning, poor water management and inappropriate technology can result in the degradation of natural resources and human impoverishment and where drought and desertification can result in land degradation and soil loss; and the area of management of marine resources, where competitive overexploitation can damage the resource base, food supplies and the livelihood of fishing communities, as well as the environment. The recommendations made in each of the sectors take into account the need for international cooperation in support of national efforts, within the context of the principles of the United Nations Conference on Environment and Development, including, inter alia, the principle of common but differentiated responsibilities. It is likewise understood that these recommendations do not in any way prejudice the work accomplished under legally binding conventions, where they exist, concerning these sectors.

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Forests

37. The management, conservation and sustainable development of all types of forests are a crucial factor in economic and social development, in environmental protection and in the planet's life-support system. Forests are one of the major reservoirs of biological diversity; they act as carbon sinks and reservoirs; and they are a significant source of renewable energy, particularly in the least developed countries. Forests are an integral part of sustainable development and are essential to many indigenous people and other forest-dependent people practising traditional lifestyles, forest owners and local communities, many of whom possess important traditional forest-related knowledge.

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## Energy

42. Energy is essential to economic and social development and improved quality of life. However, sustainable patterns of production, distribution and use of energy are crucial. Fossil fuels (coal, oil and natural gas) will continue to dominate the energy supply situation for many years to come in most developed and developing countries. What is required then is to reduce the environmental impact of their continued development, and to reduce local health hazards and environmental pollution through enhanced international cooperation, notably in the provision of concessional finance for capacity development and transfer of the relevant technology, and through appropriate national action.

43. In developing countries, sharp increases in energy services are required to improve the standard of living of their growing populations. The increase in the level of energy services would have a beneficial impact on poverty eradication by increasing employment opportunities and improving transportation, health and education. Many developing countries, in particular the least developed, face the urgent need to provide adequate modern energy services, especially to billions of people in rural areas. This requires significant financial, human and technical resources and a broad-based mix of energy sources.

44. The objectives envisaged in this section should reflect the need for equity, adequate energy supplies and increasing energy consumption in developing countries and should take into account the situation of countries that are highly dependent on income generated from the production, processing and export, and/or consumption, of fossil fuels and that have serious difficulties in switching to alternative sources of energy, and the situation of countries highly vulnerable to the adverse effects of climate change.

45. Advances towards sustainable energy use are taking place and all parties can benefit from progress made in other countries. It is also necessary to ensure international cooperation for promoting energy conservation and improvement of energy efficiency, the use of renewable energy and research, and the development and dissemination of innovative energy-related technology.

46. Therefore there is a need for:

- (a) A movement towards sustainable patterns of production, distribution and use of energy. To advance this work at the intergovernmental level, the Commission on Sustainable Development will discuss energy issues at its ninth session. Noting the vital role of energy in the continuation of sustained economic growth, especially for developing countries, be they importers or suppliers of energy, and recognizing the complexities and interdependencies inherent in addressing energy issues within the context of sustainable development, preparations for this session should be initiated at the seventh session and should utilize an open-ended intergovernmental group of experts on energy and sustainable development to be held in conjunction with inter-sessional meetings of the eighth and ninth sessions of the Commission. In line with the objectives of Agenda 21, the ninth session of the Commission should contribute to a sustainable energy future for all;
- (b) Evolving concrete measures to strengthen international cooperation in order to assist developing countries in their domestic efforts to provide adequate modern energy services, especially electricity, to all sections of their population, particularly in rural areas, in an environmentally sound manner;
- (c) Countries to promote policies and plans, bearing in mind the specific needs and priorities of developing countries, that take into account the economic, social and environmental aspects of the production, distribution and use of energy, including the use of lower-pollutant sources of energy such as natural gas;
- (d) Evolving commitments for the transfer of relevant technology, including time-bound commitments, as appropriate, to developing countries and economies in transition so as to enable them to increase the use of renewable energy sources and cleaner fossil fuels and to improve efficiency in energy production, distribution and use. Countries need to systematically increase the use of renewable energy sources according to their specific social, economic, natural, geographical and climatic conditions and cleaner fuel technologies, including fossil fuel technologies, and to improve efficiency in energy production, distribution and use and in other industrial production processes that are intensive users of energy;
- (e) Promoting efforts in research on and development and use of renewable energy technologies at the international and national levels;
- (f) In the context of fossil fuels, encouraging further research, development, and the application and transfer of technology of a cleaner and more efficient nature, through effective international support;
- (g) Encouraging Governments and the private sector to consider appropriate ways to gradually promote environmental cost internalization so as to achieve more sustainable use of energy, taking fully into account the economic, social and environmental conditions of all countries, in particular developing countries. In this regard, the international community should cooperate to minimize the possible adverse impacts on the development process of developing countries resulting from the implementation of

those policies and measures. There is also a need to encourage the reduction and the gradual elimination of subsidies for energy production and consumption that inhibit sustainable development. Such policies should take fully into account the specific needs and conditions of developing countries, particularly least developed countries, as reflected in the special and differential treatment accorded them in the Uruguay Round of multilateral trade negotiations Agreement on Subsidies and Countervailing Measures;

- (h) Encouraging better coordination on the issue of energy within the United Nations system, under the guidance of the General Assembly and taking into account the coordinating role of the Economic and Social Council.

## Commission on Sustainable Development Report of the Ninth Session (CSD-9)

Decision 9/1

Energy for sustainable development

...

### A. General considerations

1. Energy is central to achieving the goals of sustainable development.
2. The magnitude and scale of energy needs facing the world today in relation to sustainable development can be gauged by the fact that nearly one third of the global population of six billion, mostly living in developing countries, continue to lack access to energy and transportation services. Wide disparities in the levels of energy consumption within and between developed and developing countries exist. Current patterns of energy production, distribution and utilization are unsustainable.
3. The challenge ahead will require adequate, predictable, new and additional financial resources, in accordance with chapter 33 of Agenda 21,1 and paragraphs 76 to 87 of the Programme for the Further Implementation of Agenda 21,2 technology transfer and, where appropriate, political will, as well as commitment to innovative ways of applying energy efficient, environmentally sound, and cost-effective technologies and systems to all sectors of the economy. Energy resources are plentiful, and environmentally sound technological options exist and should be made available and facilitated by developed countries to developing countries as well as countries with economies in transition with a view to making energy for sustainable development a reality. Ensuring adequate and affordable access to energy for present and future generations, in an environmentally sound, socially acceptable and economically viable way, will require considerable efforts and substantial investments, including from the private sector. Attention will also need to be given to promoting an enabling environment.
4. In order to make energy systems more supportive of sustainable development objectives, contributions from all stakeholders, as well as increased investments, will be needed. Change will not be driven by resource constraints for a very long time to come. Energy for sustainable development can be achieved by providing universal access to a cost-effective mix of energy resources compatible with different needs and requirements of various countries and regions. This should include giving a greater share of the energy mix to renewable energies, improving energy efficiency and greater reliance on advanced energy technologies, including fossil fuel technologies. Policies relating to energy for sustainable development intended to promote these objectives will address many of the issues of economic and social development as well as facilitate the responsible management of environmental resources.

5. In view of the different contributions to global environmental degradations, States have common but differentiated responsibilities. The choice and implementation of policies to improve the ways to achieve energy for sustainable development basically rest with Governments. However, financial resources play a key role in their implementation. For developing countries, official development assistance (ODA) is a main source of external funding, and substantial new and additional funding for sustainable development and the implementation of Agenda 21 will be required. A participatory approach involving all relevant stakeholders could facilitate progress. Given that energy is an area with strong interdependencies among countries, international cooperation should be promoted in line with the principle of common but differentiated responsibilities. The way in which energy issues are addressed in a country depends on the national energy situation and needs. Therefore, a range of options and strategies becomes necessary to address the issues involved. Accordingly, a number of options and strategies that could effect a change in the way energy is dealt with are delineated subsequently. The choice of any specific option would obviously depend on the domestic situation.
6. The Commission underlines the importance of principle 16 of the Rio Declaration on Environment and Development in the context of energy policies, taking fully into account the economic, social and environmental conditions of all countries, in particular of developing countries.

## **B. Issues and options**

7. Governments, as well as relevant regional and international organizations and other relevant stakeholders, are invited to consider the issues and options set out below when dealing with energy, taking into account national and regional specificities and circumstances, bearing in mind the principle of common but differentiated responsibilities.
8. Foremost in the developing countries' priorities is the eradication of poverty for the furtherance of sustainable development. Efforts should therefore be made to ensure that energy policies are supportive to developing countries' efforts to eradicate poverty, with financial assistance, as appropriate. Nevertheless, environmental standards should not be applied in ways that would hinder these efforts.
9. Governments may seek assistance, as appropriate, from relevant regional and international organizations in the formulation and implementation of their domestic energy policies. The international community should support national efforts by promoting capacity-building, technology transfer, investments and other forms of financial resources for developing countries.
10. Governments, continuing to have responsibility to develop and apply energy policies to achieve sustainable development, are invited to consider the following options, as appropriate:

- (a) Combining, as appropriate, the increased use of renewable energy sources, more efficient use of energy, greater reliance on advanced energy technologies, including advanced fossil fuel technologies, and the sustainable use of traditional energy resources, which could meet the growing needs for energy services in the longer term to achieve sustainable development;
- (b) Integrating energy considerations in socio-economic programmes, especially in policy-making of major energy-consuming sectors, such as the public sector, transport, industry, agriculture, urban planning and construction;
- (c) Establishing an appropriate enabling environment conducive to attracting investments and supportive of the objectives of sustainable development and to ensuring public participation;
- (d) Developing appropriate energy services, particularly in rural areas, through the application of the most cost-effective, socially acceptable and environmentally friendly technologies, the deployment of specific energy service delivery structures and the development of renewable energy resources, including biomass;
- (e) Supporting efforts to improve the functioning of energy markets with respect to both supply and demand, with the aim of achieving greater stability and predictability and to ensure consumer access to energy services;
- (f) Establish domestic programmes for energy efficiency, including, as appropriate, by accelerating the deployment of energy efficiency technologies, with the necessary support of the international community;
- (g) Supporting increased use of renewable energies both in grid-connected and decentralized systems;
- (h) Optimizing the efficient use of fossil fuels through the increased development and use of advanced fossil fuel technologies;
- (i) Enhancing international cooperation in order to assist countries, in particular developing countries, in their efforts to achieve energy for sustainable development;
- (j) All countries should strive to promote sustainable consumption patterns; developed countries should take the lead in achieving sustainable consumption patterns; developing countries should seek to achieve sustainable consumption patterns in their development process, guaranteeing the provision of basic needs for the poor;
- (k) Encouraging public-private partnerships with a view to advancing energy for sustainable development;

- (l) Facilitating the dissemination of information on environmentally sound technologies and processes to increase awareness of these options and enhance public participation, as appropriate, in decision-making surrounding the provision of these energy services for sustainable development;
- (m) Strengthening the role of major groups, including women, inter alia, through participation in decision-making, as appropriate;
- (n) Supporting energy conservation programmes in all economic sectors;
- (o) Strengthening existing national and local institutions that develop, implement and operate national programmes on energy for sustainable development;
- (p) Supporting research, development and demonstration for the abovementioned activities towards energy for sustainable development, including on transport systems; and enhancing regional and international cooperation in the research and development in these areas.

### **C. Key issues**

11. Concerning the key issues of energy identified at the first session of the Ad Hoc Open-ended Intergovernmental Group of Experts on Energy and Sustainable Development, the Commission recommends the options and strategies set out below for each key issue. To ensure effective implementation of such key issues, the means of such implementation, namely adequate and predictable new and additional financial resources in accordance with chapter 33 of Agenda 21 and paragraphs 76 to 87 of the Programme for the Further Implementation of Agenda 21, as well as the transfer of environmentally sound technologies and capacity-building, are fundamental.

#### **1. Accessibility of energy**

##### *Challenges*

12. Access to energy is crucial to economic and social development and the eradication of poverty. Improving accessibility of energy implies finding ways and means by which energy services can be delivered reliably, affordably and in an economically viable, socially acceptable and environmentally sound manner.

##### *Recommendations*

13. Governments, taking into account their national circumstances, are encouraged to:
- (a) Establish or strengthen national and regional arrangements for promoting energy accessibility within the country;

- (b) Improve access to modern biomass technologies and fuel wood sources and supplies and commercializing biomass operations, including the use of agricultural residues, where such practices are sustainable;
- (c) Support the transition to the use of liquid and gaseous fossil fuels, where considered more environmentally sound, socially acceptable and cost-effective;
- (d) Develop locally available energy resources for greater energy diversification, where considered more environmentally sound, socially acceptable and cost-effective, with increasing use of renewable energy resources;
- (e) Support electricity services based on grid extension and/or decentralized energy technologies, particularly in isolated areas, as appropriate;
- (f) Strengthen national and regional research and development institutions/centres on energy for sustainable development, including renewable energy technologies, energy efficiency, advanced energy technologies, including advanced fossil fuel technologies, and sustainable use of traditional energy resources;
- (g) Promote an environment which enables the public sector, the private sector and, as appropriate, energy cooperatives, including through public-private partnerships, to engage in the generation, transmission and distribution of electricity at affordable rates and in the transfer of technology;
- (h) Develop renewable energy, especially in rural areas, through community-based development methods;
- (i) Enhance developing countries' access to environmentally sound and economically viable technologies relating to energy for sustainable development;
- (j) Support equal access for women to sustainable and affordable energy technologies through needs assessments, energy planning and policy formulation at the local and national levels.

## **2. Energy efficiency**

### *Challenges*

14. Energy efficiency can be a win-win solution both for developed and developing countries, but currently energy efficiency has not reached its potential. Barriers to optimizing the energy efficiency potential involve lack of access to technology, capacity-building and financial resources, as well as market related and institutional issues.

### *Recommendations*

15. Governments, taking into account their national circumstances, are encouraged to:

- (a) Strengthen public awareness programmes to mobilize all stakeholders;
- (b) Promote an enabling environment for encouraging energy service companies for research and investments in energy efficiency;
- (c) Provide incentives for energy conservation in all sectors, taking into account domestic priorities;
- (d) Develop, as appropriate, at the country and regional level, energy efficiency programmes and policy options;
- (e) Strengthen capacity-building, including education and training, ranging from energy planning to technical engineering, to improve the performance of energy and materials use;
- (f) Accelerate development and deployment of energy efficiency technologies;
- (g) Integrate, as appropriate, energy efficiency considerations into the planning, operation and maintenance of long-lived energy consuming infrastructures, notably transport, urban lay-out, industry, agriculture and tourism;
- (h) Increase the efficiency of technologies used in the production and consumption of energy;
- (i) Facilitate a movement towards more efficient utilization of energy through equipment manufacturing support programmes, with international cooperation;
- (j) Encourage the transfer of energy efficiency technologies, in particular to developing countries, on favourable terms, including on concessional and preferential terms, as mutually agreed;
- (k) Strengthen, as appropriate, existing institutions that develop and operate energy efficiency programmes;
- (l) Strengthen, as appropriate, existing institutions that compile and disseminate information on energy efficiency programmes and technologies;
- (m) Develop and implement measures that make energy efficiency technologies more affordable.

### **3. Renewable energy**

#### *Challenges*

16. The main challenge lies both for developed and developing countries in the development, utilization and dissemination of renewable energy technologies, such as solar, wind,

ocean, wave, geothermal, biomass and hydro power, on a scale wide enough to significantly contribute to energy for sustainable development. Despite some progress in promoting renewable energy applications in recent years, inter alia, through the implementation of the World Solar Programme 1996-2005, numerous constraints and barriers including costs continue to exist.

### *Recommendations*

17. Governments, taking into account their national circumstances, are encouraged to:
- (a) Develop and implement appropriate national, regional and international policies and measures to create an enabling environment for the development, utilization and distribution of renewable energy sources;
  - (b) Develop domestic programmes to increase the contribution of renewable energies to total energy consumption;
  - (c) Encourage the role of the private sector in the development and utilization of renewable energy technologies, through the provision of appropriate incentives and regulation;
  - (d) Strengthen research, development, demonstration and institutional capacities in the field of renewable energy utilization, as well as the transfer of environmentally sound and advanced technologies;
  - (e) Promote the utilization of renewable natural resources, such as solar, wind, biomass, geothermal, hydro (including mini-hydro), and ocean (wave, tidal, and thermal energy conversion) to meet part of the energy needs for sustainable development;
  - (f) Strengthen information networks, compilation and dissemination systems and public awareness programmes on renewable energy sources and technologies;
  - (g) Develop and use indigenous sources of renewable energy, where appropriate;
  - (h) Develop and implement measures to make renewable energy technologies more affordable;
  - (i) Strengthen financial support to developing countries for the promotion of renewable energy.

## **4. Advanced fossil fuel technologies**

### *Challenges*

18. Given that fossil fuels will continue to play a dominant role in the energy mix in the decades to come, the deployment and use of advanced and cleaner fossil fuel technologies should be increased. More efforts should go into supporting the further development and dissemination of those technologies.

### *Recommendations*

19. Governments, taking into account national circumstances, are encouraged to:
- (a) Develop and apply more efficient fossil-fuel fired power plants, buildings, appliances and transportation, including cleaner coal and oil technologies;
  - (b) Increase the use of cleaner fossil fuels to improve efficiency in energy production, distribution and use, where appropriate;
  - (c) Research, develop and transfer technologies for transforming solid fuels to liquid or gaseous fuels;
  - (d) Enhance research, development, demonstration and transfer of advanced fossil fuel technologies leading to lower emissions;
  - (e) Promote research and, where suitable, applications of carbon capture and storage technologies;
  - (f) Promote cooperation with industries in a voluntary programme framework for cleaner fossil fuel technology deployment;
  - (g) Develop and implement measures to make advanced fossil fuel technologies more accessible and affordable.

## **5. Nuclear energy technologies**

### *Challenges*

20. Nuclear power currently accounts for 16 per cent of the world's electricity generation. However, nuclear energy is associated with a number of concerns, in particular regarding nuclear safety, spent fuel, waste management, transboundary consequences and decommissioning. The choice of nuclear energy rests with countries. Some countries have been using nuclear energy technologies safely and see no inordinate concern in using and developing additional technology for properly managing and controlling spent fuel and other nuclear materials, and some of these countries consider that the use of nuclear energy should be increased. From their perspective, nuclear power is a sustainable energy source with both economical and environmental advantages. In their view, the removal of the option of nuclear power would remove an important element of flexibility and diversity in energy supply. For those countries that choose nuclear energy, the challenge lies in ensuring environmentally sound, socially acceptable and cost-

effective solutions and in addressing nuclear safety and spent fuel and waste management as well as public concerns on these issues. Many countries seek the promotion of international cooperation in the peaceful use of nuclear energy. Some other countries have decided to phase out nuclear energy from their energy supply mix. Other countries, including several developed countries as well as small island developing States, do not use nuclear energy and do not consider nuclear energy as an appropriate or acceptable source of energy. Many of these countries are of the view that nuclear energy is not compatible with the objectives of sustainable development, and that risks related to safety, waste management and transport and stranded costs remain unsolved. Some are also of the opinion that the use of nuclear energy in general should be phased out as soon as practically possible.

### *Recommendations*

21. Governments, taking into account their national circumstances, are encouraged to:

- (a) Support their national efforts, including research, and international cooperation as an effective tool in addressing the issues of nuclear safety and spent fuel and waste management;
- (b) Strengthen independent national regulatory agencies and promote international cooperation in nuclear safety;
- (c) Promote a high level of nuclear safety;
- (d) Improve the transparency of nuclear safety-related decisions, inter alia, through public participation, where appropriate;
- (e) Promote public education and participation as well as capacity-building of human resources, in the areas of nuclear energy and waste management;
- (f) Further develop technological solutions for long-lived radioactive waste;
- (g) Address the safety of their nuclear energy installations, as deemed appropriate, after assessment by national regulatory authorities, including consideration of the option of phasing out and closing, as appropriate, such installations;
- (h) Recalling paragraph 8 of the Governing Council of the International Atomic Energy Agency (IAEA) resolution GC (44)/RES/17 and taking into account the very serious potential for environment and human health impacts of radioactive wastes, make efforts to examine and further improve measures and internationally agreed regulations regarding safety, while stressing the importance of having effective liability mechanisms in place, relevant to international maritime transportation and other transboundary movement of radioactive material, radioactive waste and spent fuel, including, inter alia, arrangements for prior

notification and consultations done in accordance with relevant international instruments.

## **6. Rural energy**

### *Challenges*

22. To implement the goal accepted by the international community to halve the proportion of people living on less than US\$ 1 per day by 2015, access to affordable energy services is a prerequisite. Efforts at finding the most appropriate solution to the energy problems of rural areas are hampered by the enormity of the problem, the limited availability of resources and lack of appropriate technologies, the high investment cost and connection fees and insufficient attention to rural development in general. An effective strategy to address the energy needs of rural populations can be to promote the climbing of the energy ladder. This implies both improving ways of using biomass as well as moving from simple biomass fuels to the most convenient efficient form of energy appropriate to the task at hand, usually liquid or gaseous fuels for cooking and heating and electricity for most other uses.

### *Recommendations*

23. Governments, taking into account their national circumstances, are encouraged to:
- (a) Strengthen and, where appropriate, establish policies on energy for rural development, including, as appropriate, regulatory systems to promote access to energy in rural areas;
  - (b) Develop, where necessary, specific and targeted energy service delivery structures adapted to rural needs;
  - (c) Promote local energy enterprises as employment opportunities, enhance local private entrepreneurs and develop local dealers to sell/maintain equipment building on local retail networks and relationships;
  - (d) Take into consideration the health and safety concerns of women and children in rural energy programmes;
  - (e) Promote research and development of the rural energy situation in support of the achievement of international development priorities, particularly poverty eradication;
  - (f) Promote a sustainable use of biomass and, as appropriate, other renewable energies through improvement of current patterns of use, such as management of resources, more efficient use of fuelwood and new or improved products and technologies; the poor;

- (g) Support local groups and/or non-governmental organizations in the promotion and delivery of newly developed environmentally sound technologies, including solar cooker technology;
- (h) Develop and utilize indigenous energy sources and infrastructures for various local uses and promote rural community participation, including local Agenda 21 groups, with the support of the international community, in developing and utilizing renewable energy technologies to meet their daily energy needs to find simple and local solutions;
- (i) Promote capacity-building in local societies and remove barriers in the implementation of policies for renewable energy development in rural areas;
- (j) Promote efforts to address the disproportionate burdens experienced by women in rural areas, including carrying loads of fuelwood over long distances and suffering adverse health effects from prolonged exposure to open fires.

## **7. Energy and transport**

### *Challenges*

24. The transport sector is a major energy consuming sector and the sector for which energy consumption is projected to grow at the highest rate. The challenge is to promote an integrated approach to developing transport systems for sustainable development.

### *Recommendations*

25. Governments, taking into account their national circumstances, are encouraged to:
- (a) Manage transportation demand;
  - (b) Implement better transportation practices, including planning, in both urban and rural contexts, particularly towards public transportation systems and rail or water based freight transport;
  - (c) Increase fuel efficiency for different transportation modes;
  - (d) Promote the use of cleaner fuels and transport equipment and assist with the implementation of the recommendations of the General Assembly at its nineteenth special session on the progressive phasing out of the use of lead in gasoline, inter alia, by making available information, technical assistance, capacitybuilding and funding to developing countries, including the time-bound transfer of technology;
  - (e) Integrate transport policy in other sustainable development policies.

## **D. Overarching issues**

### **1. Research and development**

26. The enhancement of research and development at the national, regional and international levels of advanced and cleaner fossil fuel technologies, more efficient energy technologies and renewable energy technologies is important for achieving energy for sustainable development for all. Governments are encouraged to develop policies and incentives and to act as a catalyst to foster private sector investment in this field. Increased energy research should also come from public and private investments or through joint public and private partnerships and/or through international and regional cooperation.

### **2. Capacity-building**

27. Lack of local capacity is a major obstacle to the expansion of energy services in the developing world. It is important that institutions, infrastructures and human resources in developing countries be strengthened and that technological leadership in developing countries as well as in countries with economies in transition, with special efforts for least developed countries and small island developing States, be enhanced through international public and private cooperation that supports sustainable development objectives. Developed countries, development banks, the United Nations Development Programme (UNDP) and other relevant agencies, including the regional commissions and bilateral development agencies, should focus on capacity-building in development cooperation. A substantially replenished Global Environment Facility (GEF) would, among other things, continue to provide support, within its mandate, for capacity-building and technology transfer to developing countries to advance energy for sustainable development. International financial institutions should, through their lending policies, support capacitybuilding and technology transfer as well as efforts to identify local needs.

### **3. Technology transfer**

28. In order to promote energy for sustainable development there is a need for favourable access to and transfer of environmentally sound technologies, in particular to developing countries, through supportive measures that promote technology cooperation and that should enable the transfer of necessary technological know-how and the building up of economic, technical and managerial capabilities for the efficient use and further development of transferred technology. Technology cooperation involves joint efforts by enterprises and Governments, both suppliers of technology and its recipients. Therefore, such cooperation entails an iterative process, involving government, the private sector and research and development facilities, to ensure the best possible results from transfer of technology. Successful long-term partnerships in technology cooperation necessarily require continuing systematic training and capacity-building at all levels over an extended period of time.

#### **4. Information-sharing and dissemination**

29. Information- and knowledge-sharing on technologies and policies facilitate efforts to achieve energy for sustainable development. Relevant information could direct decision makers to suitable policy and energy supply options. Very often, the lack of such information and knowledge precludes countries from adopting new approaches in energy planning and technology applications. Internet-based information could assist such an exchange of information. Developing countries require the assistance of developed countries in the area of information technology.

#### **5. Mobilization of financial resources**

30. Financial resources and mechanisms play a key role in the implementation of Agenda 21. In general, the financing for the implementation of Agenda 21 will come from a country's own public and private sectors. For developing countries, ODA is an important source of external funding and new and additional funding for sustainable development and energy for sustainable development and the implementation of Agenda 21 will be required. Hence all financial commitments of Agenda 21, particularly those contained in its chapter 33 and the provisions with regard to new and additional resources that are both adequate and predictable need to be urgently fulfilled. Renewed efforts are essential to ensure that all sources of funding contribute to economic growth, social development and environmental protection in the context of sustainable development and the implementation of Agenda 21. Many Governments have initiated reforms aimed at improving regulatory frameworks and institutional set-ups in order to attract private sector funding. Specific policies have been introduced to induce the flow of investment capital for energy technology for sustainable development. While more sustainable technologies often have lower operating costs than competing solutions, they sometimes require greater initial investments. Particular attention should therefore be paid to the difficulties of financing these essential infrastructure investments in developing countries. Financing from GEF, within its mandate, could also be considered in this context.

#### **6. Making markets work effectively for sustainable development**

31. Policies to reduce market distortions would promote energy systems compatible with sustainable development through the use of improved market signals and by removing market distortions, including restructuring taxation and phasing out of harmful subsidies, where they exist, to reflect their environmental impacts. Such policies should take fully into account the specific needs and conditions of developing countries, with the aim of minimizing the possible adverse impacts on their development. Governments are encouraged to improve the functioning of national energy markets in such a way that they support sustainable development, overcome market barriers and improve accessibility, taking fully into account that such policies should be decided by each country, and that its own characteristics and capabilities and different levels of development should be considered, especially as reflected in national sustainable development strategies, where they exist.

## 7. Multi-stakeholder approach and public participation

32. Energy solutions that are compatible with sustainable development require the participation of all stakeholders and the involvement of the public at large. The capacity of community-based organizations and institutions, including women's groups, to facilitate participatory approaches to energy for sustainable development should be strengthened, taking into account principle 10 of the Rio Declaration on Environment and Development with full recognition of principles 5, 7 and 11.
33. The Commission notes with appreciation the efforts made at the regional level and by interest groups to discuss the key issues and formulate regional positions and programmes of action to promote energy for sustainable development. It welcomes the statements that have resulted from these deliberations, recognizing that they provide valuable inputs to the work of the Commission. Moreover, it encourages the Governments in these regional deliberations to actively promote the implementation of the resulting programmes of action. In particular, the Commission recognized the value of regional cooperation in achieving economies of scale in energy services for sustainable development.
34. From these statements, the Commission recommends implementation of the following regional and subregional endeavours that may require subregional, regional, and international support:
  - (a) Strengthening national and regional energy institutions or arrangements for enhancing regional and international cooperation on energy for sustainable development, in particular to assist developing countries in their domestic efforts to provide modern energy services to all sections of their populations by:
    - (i) Conducting in depth studies to promote sustainable development in the energy sector in the region, including the social, economic and environmental situation of the region and energy alternatives that support sustainable development;
    - (ii) Promoting training and exchange of experience and regarding energy efficiency, renewable energy and advanced fossil-fuel technologies and lessons learned;
    - (iii) Strengthening regional networks of centres of excellence for the exchange of information and experience in the research, development and application of energy efficiency technologies, advanced fossil fuel and renewable energy;
    - (iv) Strengthening and, where appropriate, establishing regional information and dissemination capabilities to provide information to the energy service industry on market opportunities and energy

infrastructure and information to consumers on the benefits of energy efficiency measures;

- (b) Promoting, at the regional level, rural electrification projects, including, renewable energy technologies, and supporting local efforts to provide energy supplies to their basic infrastructures, as well as integrating energy policies into overall rural development strategies, with emphasis on income-generation, taking into account national circumstances;
- (c) Strengthening and facilitating, as appropriate, regional cooperation arrangements for promoting cross-border energy trade, including the interconnection of electricity grids and oil and natural gas pipelines;
- (d) Strengthening and, where appropriate, facilitating dialogue forums among regional, national and international producers and consumers of energy; and to that effect, the Commission complements the work of existing international energy forums;
- (e) Promoting, where appropriate, cooperation among the concerned countries of the region and with the support of the international organizations to improve development and production of hydro-carbon fields through integrated cost reduction, enhanced operational efficiency, and application of advanced and more environmentally sound technology;
- (f) Fostering regional cooperation when undertaking research, development and demonstration of energy efficiency, renewable energy and advanced fossil fuel technologies;
- (g) Encouraging regional cooperation for capacity-building, including South-South cooperation.

## **F. International cooperation**

35. The Commission recognizes the critical role that international cooperation, including regional cooperation, can play in assisting countries, particularly developing countries, in their efforts to achieve the goals of sustainable development. In particular, international cooperation can be very effective in capacity-building, education, technology transfer, information-sharing, research and development, and the mobilization of resources, including financial resources, taking into account the above-mentioned key issues and energy sources.
36. The Commission recommends, in particular, international cooperation in the following areas:
- 1. Take concrete measures to maximize existing and to explore ways to increase financial resources and create innovative financing solutions to support energy for

sustainable development, including through debt relief and, where possible, debt cancellation, facilitating foreign investment, action to reverse the downward trend in ODA, and strive to fulfil the commitments undertaken to reach the accepted United Nations target of 0.7 per cent of gross national product (GNP) as soon as possible, the incorporation of energy for sustainable development considerations in bilateral and multilateral development cooperation programmes and in development cooperation programme activities of the international financial institutions and general lending policies, including through addressing the development of energy policy in national poverty eradication policies, where they exist. In this context, consideration should also be given to how, inter alia, ODA can be used to leverage private funds for the development of energy solutions that are compatible with sustainable development, bearing in mind that for developing countries ODA is a main source of external funding.

2. Continuing the dialogue on issues relating to energy for sustainable development within the World Summit on Sustainable Development process, in accordance with General Assembly resolution 55/199.
3. Promoting international public-private partnership cooperation programmes for promoting affordable, energy efficient and advanced fossil fuel and renewable energy technologies.
4. Promote networking between centres of excellence on energy for sustainable development by linking competent centres on energy technologies for sustainable development that could support and promote efforts at capacity-building and technology transfer activities, as well as serve as information clearing houses.
5. Making available grants and loans to developing countries on favourable terms that would permit sharing the cost of the development of energy infrastructure, including rural and remote energy infrastructure, with relevant international lending institutions and private sector investments.
6. Exploring the scope of the use of existing international mechanisms for financing infrastructure development to identify risks and ensure they are managed on a transparent basis, with an effective equitable partnership between investors and host countries, since developing countries do not have institutional structures that are adequately prepared to deal with the scale of commercial risks associated with major energy investments.
7. Supporting the international endeavours to promote equal access and opportunities for women in relation to energy, including credit facilities and involvement in energy policy decision-making processes.

## Johannesburg Plan of Implementation (2002)

...

9. Take joint actions and improve efforts to work together at all levels to improve access to reliable and affordable energy services for sustainable development sufficient to facilitate the achievement of the Millennium development goals, including the goal of halving the proportion of people in poverty by 2015, and as a means to generate other important services that mitigate poverty, bearing in mind that access to energy facilitates the eradication of poverty. This would include actions at all levels to:
  - (a) Improve access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services and resources, taking into account national specificities and circumstances, through various means, such as enhanced rural electrification and decentralized energy systems, increased use of renewables, cleaner liquid and gaseous fuels and enhanced energy efficiency, by intensifying regional and international cooperation in support of national efforts, including through capacity -building, financial and technological assistance and innovative financing mechanisms, including at the micro - and meso - levels, recognizing the specific factors for providing access to the poor;
  - (b) Improve access to modern biomass technologies and fuelwood sources and supplies and commercialize biomass operations, including the use of agricultural residues, in rural areas and where such practices are sustainable;
  - (c) Promote a sustainable use of biomass and, as appropriate , other renewable energies through improvement of current patterns of use, such as management of resources, more efficient use of fuelwood and new or improved products and technologies;
  - (d) Support the transition to the cleaner use of liquid and gaseous fossil fuels, where considered more environmentally sound, socially acceptable and cost-effective;
  - (e) Develop national energy policies and regulatory frameworks that will help to create the necessary economic, social and institutional conditions in the energy sector to improve access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services for sustainable development and poverty eradication in rural, peri-urban and urban areas;
  - (f) Enhance international and regional cooperation to improve access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services, as an integral part of poverty reduction programmes, by facilitating the creation of enabling environments and addressing capacity-building needs, with special attention to rural and isolated areas, as appropriate;

- (g) Assist and facilitate on an accelerated basis, with the financial and technical assistance of developed countries, including through public–private partnerships, the access of the poor to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services, taking into account the instrumental role of developing national policies on energy for sustainable development, bearing in mind that in developing countries sharp increases in energy services are required to improve the standards of living of their populations and that energy services have positive impacts on poverty eradication and improve standards of living.

...

20. Call upon Governments as well as relevant regional and international organizations and other relevant stakeholders to implement, taking into account national and regional specificities and circumstances, the recommendations and conclusions adopted by the Commission on Sustainable Development concerning energy for sustainable development at its ninth session, including the issues and options set out below, bearing in mind that in view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. This would include actions at all levels to:

- (a) Take further action to mobilize the provision of financial resources, technology transfer, capacity -building and the diffusion of environmentally sound technologies according to the recommendations and conclusions of the Commission on Sustainable Development, as contained in section A, paragraph 3, and section D, paragraph 30, of its decision 9/19 on energy for sustainable development;
- (b) Integrate energy considerations, including energy efficiency, affordability and accessibility, into socio -economic programmes, especially into policies of major energy -consuming sectors, and into the planning, operation and maintenance of long-lived energy consuming infrastructures, such as the public sector, transport, industry, agriculture, urban land use, tourism and construction sectors;
- (c) Develop and disseminate alternative energy technologies with the aim of giving a greater share of the energy mix to renewable energies, improving energy efficiency and greater reliance on advanced energy technologies, including cleaner fossil fuel technologies;
- (d) Combine, as appropriate, the increased use of renewable energy resources, more efficient use of energy, greater reliance on advanced energy technologies, including advanced and cleaner fossil fuel technologies, and the sustainable use of traditional energy resources, which could meet the growing need for energy services in the longer term to achieve sustainable development;

- (e) Diversify energy supply by developing advanced, cleaner, more efficient, affordable and cost-effective energy technologies, including fossil fuel technologies and renewable energy technologies, hydro included, and their transfer to developing countries on concessional terms as mutually agreed. With a sense of urgency, substantially increase the global share of renewable energy sources with the objective of increasing its contribution to total energy supply, recognizing the role of national and voluntary regional targets as well as initiatives, where they exist, and ensuring that energy policies are supportive to developing countries' efforts to eradicate poverty, and regularly evaluate available data to review progress to this end;
- (f) Support efforts, including through provision of financial and technical assistance to developing countries, with the involvement of the private sector, to reduce flaring and venting of gas associated with crude oil production;
- (g) Develop and utilize indigenous energy sources and infrastructures for various local uses and promote rural community participation, including local Agenda 21 groups, with the support of the international community, in developing and utilizing renewable energy technologies to meet their daily energy needs to find simple and local solutions;
- (h) Establish domestic programmes for energy efficiency, including, as appropriate, by accelerating the deployment of energy efficiency technologies, with the necessary support of the international community;
- (i) Accelerate the development, dissemination and deployment of affordable and cleaner energy efficiency and energy conservation technologies, as well as the transfer of such technologies, in particular to developing countries, on favourable terms, including on concessional and preferential terms, as mutually agreed;
- (j) Recommend that international financial institutions and other agencies' policies support developing countries, as well as countries with economies in transition, in their own efforts to establish policy and regulatory frameworks which create a level playing field between the following: renewable energy, energy efficiency, advanced energy technologies, including advanced and cleaner fossil fuel technologies, and centralized, distributed and decentralized energy systems;
- (k) Promote increased research and development in the field of various energy technologies, including renewable energy, energy efficiency and advanced energy technologies, including advanced and cleaner fossil fuel technologies, both nationally and through international collaboration; strengthen national and regional research and development institutions/centres on reliable, affordable, economically viable, socially acceptable and environmentally sound energy for sustainable development;

- (l) Promote networking between centres of excellence on energy for sustainable development, including regional networks, by linking competent centres on energy technologies for sustainable development that could support and promote efforts at capacity -building and technology transfer activities, particularly of developing countries, as well as serve as information clearing houses;
- (m) Promote education to provide information for both men and women about available energy sources and technologies;
- (n) Utilize financial instruments and mechanisms, in particular the Global Environment Facility, within its mandate, to provide financial resources to developing countries, in particular least developed countries and small island developing States, to meet their capacity needs for training, technical know-how and strengthening national institutions in reliable, affordable, economically viable, socially acceptable and environmentally sound energy, including promoting energy efficiency and conservation, renewable energy and advanced energy technologies, including advanced and cleaner fossil fuel technologies;
- (o) Support efforts to improve the functioning, transparency and information about energy markets with respect to both supply and demand, with the aim of achieving greater stability and predictability, and to ensure consumer access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services;
- (p) Policies to reduce market distortions would promote energy systems compatible with sustainable development through the use of improved market signals and by removing market distortions, including restructuring taxation and phasing out harmful subsidies, where they exist, to reflect their environmental impacts, with such policies taking fully into account the specific needs and conditions of developing countries, with the aim of minimizing the possible adverse impacts on their development;
- (q) Take action, where appropriate, to phase out subsidies in this area that inhibit sustainable development, taking fully into account the specific conditions and different levels of development of individual countries and considering their adverse effect, particularly on developing countries;
- (r) Governments are encouraged to improve the functioning of national energy markets in such a way that they support sustainable development, overcome market barriers and improve accessibility, taking fully into account that such policies should be decided by each country, and that its own characteristics and capabilities and level of development should be considered, especially as reflected in national sustainable development strategies, where they exist;
- (s) Strengthen national and regional energy institutions or arrangements for enhancing regional and international cooperation on energy for sustainable

development, in particular to assist developing countries in their domestic efforts to provide reliable, affordable, economically viable, socially acceptable and environmentally sound energy services to all sections of their populations;

- (t) Countries are urged to develop and implement actions within the framework of the ninth session of the Commission on Sustainable Development, including through public -private partnerships, taking into account the different circumstances of countries, based on lessons learned by Governments, international institutions and stakeholders, including business and industry, in the field of access to energy, including renewable energy and energy-efficiency and advanced energy technologies, including advanced and cleaner fossil fuel technologies;
  - (u) Promote cooperation between international and regional institutions and bodies dealing with different aspects of energy for sustainable development within their existing mandate, bearing in mind paragraph 46 (h) of the Programme of Action for the Further Implementation of Agenda 21, strengthening, as appropriate, regional and national activities for the promotion of education and capacity – building regarding energy for sustainable development;
  - (v) Strengthen and facilitate, as appropriate, regional cooperation arrangements for promoting cross-border energy trade, including the interconnection of electricity grids and oil and natural gas pipelines;
  - (w) Strengthen and, where appropriate, facilitate dialogue forums among regional, national and international producers and consumers of energy.
21. Promote an integrated approach to policy -making at the national, regional and local levels for transport services and systems to promote sustainable development, including policies and planning for land use, infrastructure, public transport systems and goods delivery networks, with a view to providing safe, affordable and efficient transportation, increasing energy efficiency, reducing pollution, congestion and adverse health effects and limiting urban sprawl, taking into account national priorities and circumstances. This would include actions at all levels to:
- (a) Implement transport strategies for sustainable development, reflecting specific regional, national and local conditions, to improve the affordability, efficiency and convenience of transportation as well as urban air quality and health and reduce greenhouse gas emissions, including through the development of better vehicle technologies that are more environmentally sound, affordable and socially acceptable;
  - (b) Promote investment and partnerships for the development of sustainable, energy efficient multi-modal transportation systems, including public mass transportation systems and better transportation systems in rural areas, with technical and

financial assistance for developing countries and countries with economies in transition.

22. Prevent and minimize waste and maximize reuse, recycling and use of environmentally friendly alternative materials, with the participation of government authorities and all stakeholders, in order to minimize adverse effects on the environment and improve resource efficiency, with financial, technical and other assistance for developing countries. This would include actions at all levels to:

(a) Develop waste management systems, with the highest priority placed on waste prevention and minimization, reuse and recycling, and environmentally sound disposal facilities, including technology to recapture the energy contained in waste, and encourage small-scale waste-recycling initiatives that support urban and rural waste management and provide income -generating opportunities, with international support for developing countries;

...

#### **IV. Protecting and managing the natural resource base of economic and social development**

...

26. Develop integrated water resources management and water efficiency plans by 2005, with support to developing countries, through actions at all levels to:

(f) Support, where appropriate, efforts and programmes for energy -efficient, sustainable and cost-effective desalination of seawater, water recycling and water harvesting from coastal fogs in developing countries, through such measures as technological, technical and financial assistance and other modalities;

...

38. Change in the Earth's climate and its adverse effects are a common concern of humankind. We remain deeply concerned that all countries, particularly developing countries, including the least developed countries and small island developing States , face increased risks of negative impacts of climate change and recognize that, in this context, the problems of poverty, land degradation, access to water and food and human health remain at the centre of global attention. The United Nations Framework Convention on Climate Change 27 is the key instrument for addressing climate change, a global concern, and we reaffirm our commitment to achieving its ultimate objective of stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner, in accordance with our common but differentiated responsibilities

and respective capabilities. Recalling the United Nations Millennium Declaration, in which heads of State and Government resolved to make every effort to ensure the entry into force of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, preferably by the tenth anniversary of the United Nations Conference on Environment and Development in 2002, and to embark on the required reduction of emissions of greenhouse gases, States that have ratified the Kyoto Protocol strongly urge States that have not already done so to ratify it in a timely manner. Actions at all levels are required to:

(f) Develop and disseminate innovative technologies in regard to key sectors of development, particularly energy, and of investment in this regard, including through private sector involvement, market-oriented approaches, and supportive public policies and international cooperation;

...

41. Strengthen the implementation of the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa, to address causes of desertification and land degradation in order to maintain and restore land, and to address poverty resulting from land degradation. This would include actions at all levels to:

(d) Integrate measures to prevent and combat desertification as well as to mitigate the effects of drought through relevant policies and programmes, such as land, water and forest management, agriculture, rural development, early warning systems, environment, energy, natural resources, health and education, and poverty eradication and sustainable development strategies;

...

45. Forests and trees cover nearly one third of the Earth's surface. Sustainable forest management of both natural and planted forests and for timber and non-timber products is essential to achieving sustainable development as well as a critical means to eradicate poverty, significantly reduce deforestation, halt the loss of forest biodiversity and land and resource degradation and improve food security and access to safe drinking water and affordable energy; in addition, it highlights the multiple benefits of both natural and planted forests and trees and contributes to the well-being of the planet and humanity. The achievement of sustainable forest management, nationally and globally, including through partnerships among interested Governments and stakeholders, including the private sector, indigenous and local communities and non-governmental organizations, is an essential goal of sustainable development.

...

56. Reduce respiratory diseases and other health impacts resulting from air pollution, with particular attention to women and children, by:

(d) Assisting developing countries in providing affordable energy to rural communities, particularly to reduce dependence on traditional fuel sources for cooking and heating, which affect the health of women and children.

...

59. Support the availability of adequate, affordable and environmentally sound energy services for the sustainable development of small island developing States by, inter alia:

- (a) Strengthening ongoing and supporting new efforts on energy supply and services, by 2004, including through the United Nations system and partnership initiatives;
- (b) Developing and promoting efficient use of sources of energy, including indigenous sources and renewable energy, and building the capacities of small island developing States for training, technical know-how and strengthening national institutions in the area of energy management.

...

62. Since the United Nations Conference on Environment and Development, sustainable development has remained elusive for many African countries. Poverty remains a major challenge and most countries on the continent have not benefited fully from the opportunities of globalization, further exacerbating the continent's marginalization. Africa's efforts to achieve sustainable development have been hindered by conflicts, insufficient investment, limited market access opportunities and supply side constraints, unsustainable debt burdens, historically declining levels of official development assistance and the impact of HIV/AIDS. The World Summit on Sustainable Development should reinvigorate the commitment of the international community to address these special challenges and give effect to a new vision based on concrete actions for the implementation of Agenda 21 in Africa. The New Partnership for Africa's Development (NEPAD) is a commitment by African leaders to the people of Africa. It recognizes that partnerships among African countries themselves and between them and with the international community are key elements of a shared and common vision to eradicate poverty, and furthermore it aims to place their countries, both individually and collectively, on a path of sustained economic growth and sustainable development, while participating actively in the world economy and body politic. It provides a framework for sustainable development on the continent to be shared by all Africa's people. The international community welcomes NEPAD and pledges its support to the implementation of this vision, including through utilization of the benefits of South-South cooperation supported, inter alia, by the Tokyo International Conference on African Development. It also pledges support for other existing development frameworks that are owned and driven nationally by African countries and that embody poverty reduction strategies, including poverty reduction strategy papers. Achieving sustainable development includes actions at all levels to:

(j) Deal effectively with energy problems in Africa, including through initiatives to:

(i) Establish and promote programmes, partnerships and initiatives to support Africa's efforts to implement NEPAD objectives on energy, which seek to secure access for at least 35 per cent of the African population within 20 years, especially in rural areas;

(ii) Provide support to implement other initiatives on energy, including the promotion of cleaner and more efficient use of natural gas and increased use of renewable energy, and to improve energy efficiency and access to advanced energy technologies, including cleaner fossil fuel technologies, particularly in rural and peri-urban areas;

...

73. The Initiative of Latin America and the Caribbean on Sustainable Development is an undertaking by the leaders of that region that, building on the Platform for Action on the Road to Johannesburg, 2002, which was approved in Rio de Janeiro in October 2001, recognizes the importance of regional actions towards sustainable development and takes into account the region's singularities, shared visions and cultural diversity. It is targeted towards the adoption of concrete actions in different areas of sustainable development, such as biodiversity, water resources, vulnerabilities and sustainable cities, social aspects, including health and poverty, economic aspects, including energy, and institutional arrangements, including capacity-building, indicators and participation of civil society, taking into account ethics for sustainable development.

...

76. The Regional Platform identified seven initiatives for follow-up action: capacity - building for sustainable development; poverty reduction for sustainable development; cleaner production and sustainable energy; land management and biodiversity conservation; protection and management of and access to freshwater resources; oceans, coastal and marine resources and sustainable development of small island developing States; and action on atmosphere and climate change. Follow-up actions of these initiatives will be taken through national strategies and relevant regional and subregional initiatives, such as the Regional Action Programme for Environmentally Sound and Sustainable Development and the Kitakyushu Initiative for a Clean Environment, adopted at the Fourth Ministerial Conference on Environment and Development in Asia and the Pacific organized by the Economic and Social Commission for Asia and the Pacific.

**2005 World Summit  
Resolution adopted by the General Assembly  
60/1. 2005 World Summit Outcome**

*The General Assembly Adopts* the following 2005 World Summit Outcome:

...

50. We face serious and multiple challenges in tackling climate change, promoting clean energy, meeting energy needs and achieving sustainable development, and we will act with resolve and urgency in this regard.

...

54. We acknowledge various partnerships that are under way to advance action on clean energy and climate change, including bilateral, regional and multilateral initiatives.

55. We are committed to taking further action through practical international cooperation, *inter alia*:

(a) To promote innovation, clean energy and energy efficiency and conservation; improve policy, regulatory and financing frameworks; and accelerate the deployment of cleaner technologies;

(b) To enhance private investment, transfer of technologies and capacitybuilding to developing countries, as called for in the Johannesburg Plan of Implementation, taking into account their own energy needs and priorities;

...

(i) To accelerate the development and dissemination of affordable and cleaner energy efficiency and energy conservation technologies, as well as the transfer of such technologies, in particular to developing countries, on favourable terms, including on concessional and preferential terms, as mutually agreed, bearing in mind that access to energy facilitates the eradication of poverty;

...

(o) To note that cessation of the transport of radioactive materials through the regions of small island developing States is an ultimate desired goal of small island developing States and some other countries and recognize the right of freedom of navigation in accordance with international law. States should maintain dialogue and consultation, in particular under the aegis of the International Atomic Energy Agency and the International Maritime Organization, with the aim of improved mutual understanding, confidence-building and enhanced communication in relation to the safe maritime

transport of radioactive materials. States involved in the transport of such materials are urged to continue to engage in dialogue with small island developing States and other States to address their concerns. These concerns include the further development and strengthening, within the appropriate forums, of international regulatory regimes to enhance safety, disclosure, liability, security and compensation in relation to such transport.

...

### **Science and technology for development**

60. We recognize that science and technology, including information and communication technology, are vital for the achievement of the development goals and that international support can help developing countries to benefit from technological advancements and enhance their productive capacity. We therefore commit ourselves to:

(a) Strengthening and enhancing existing mechanisms and supporting initiatives for research and development, including through voluntary partnerships between the public and private sectors, to address the special needs of developing countries in the areas of health, agriculture, conservation, sustainable use of natural resources and environmental management, energy, forestry and the impact of climate change;

...

(d) Promoting and supporting greater efforts to develop renewable sources of energy, such as solar, wind and geothermal;