



Economic and Social Council

Distr.
GENERAL

E/CN.17/1997/7
27 January 1997

ORIGINAL: ENGLISH

COMMISSION ON SUSTAINABLE DEVELOPMENT
Fifth session
7-25 April 1997

Inventory of ongoing energy-related programmes and activities of entities within the United Nations system, on coordination of such activities and on arrangements needed to foster the linkage between energy and sustainable development within the system

Report of the Secretary-General

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INTRODUCTION

1. The Committee on New and Renewable Sources of Energy and on Energy for Development (CNRSEED) at its second session, in February 1996, requested the Secretary-General to prepare a report on the activities of the organizations of the United Nations system in the field of energy for consideration by the Committee at its third session in 1998. The Commission on Sustainable Development at its fourth session, in 1996, requested the Secretary-General to prepare a report, for consideration at its fifth session, in 1997, providing an inventory of ongoing energy-oriented programmes and activities within the United Nations system, as well as proposals for arrangements, as appropriate, that might be needed to foster the linkage between energy and sustainable development within the United Nations system.¹ The Economic and Social Council, at its substantive session of 1996, requested the Secretary-General to take into account the report and views of the Committee on New and Renewable Sources of Energy and on Energy for Development when preparing the report requested by the Commission.²

2. This report has been prepared in response to the above request. It is based on information compiled in-house as well as that provided by the relevant entities within the United Nations system. The report also benefited from the inputs of the Committee on New and Renewable Sources of Energy and on Energy for Development. The outline was discussed and adopted by the Ad Hoc Inter-Agency Group on Energy, which met at Geneva on 12 September 1996. At a follow-up meeting of the Ad Hoc Inter-Agency Group, proposals for future actions and arrangements to foster linkages between entities within the United Nations system concerned with energy and sustainable development were identified and discussed. The present report consists of a description of activities, assessments and conclusions.

I. INVENTORY OF ENERGY-RELATED PROGRAMMES AND ACTIVITIES WITHIN THE UNITED NATIONS SYSTEM

A. Policies in regard to energy-related activities of the United Nations system

3. The policies and programmes of the United Nations system in the energy field contribute to the overall objectives of the organization. An explicit energy-related policy resulted from the United Nations Conference on New and Renewable Sources of Energy, held at Nairobi in 1981. The energy discussion at the United Nations Conference on Environment and Development, held at Rio de Janeiro in 1992, resulted in the recognition that:

"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

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growing reliance on environmentally sound energy systems, particularly new and renewable sources of energy. All energy sources will need to be used in ways that respect the atmosphere, human health and the environment as a whole."³

The United Nations Framework Convention on Climate Change (UNFCCC), adopted and opened for signature at Rio de Janeiro in 1992, relates in its implementation to the energy policies of the Parties to the Convention. In the subsequent major conferences, energy was invariably addressed as one of the key factors for furthering sustainable development. The Global Conference on the Sustainable Development of Small Island Developing States, held in Barbados in 1994, adopted the Declaration of Barbados and the Programme of Action for the Sustainable Development of Small Island Developing States, which includes a chapter on energy resources that identifies issues, problems and constraints facing small island developing States and recommends ways and means, including policy options, for ensuring adequate, environmentally sound energy supplies for meeting their social and economic development objectives in the most efficient manner.

4. Policy discussions on energy take place in various intergovernmental bodies. The Committee on New and Renewable Sources of Energy and on Energy for Development, a body of government-nominated experts, established with its current mandate in 1992, provides advice on trends in energy exploration and development, especially in developing countries. It discusses all sources of renewable energy and addresses such issues as energy and material intensity. The 1992 mandate is clearly directed towards sustainable energy development. For its deliberations, it is provided with in-depth reports by the Secretary-General. The Committee reports to the Economic and Social Council. The substantive secretariat support is provided by the Division for Sustainable Development of the Department for Policy Coordination and Sustainable Development (DPCSD) of the United Nations Secretariat, in coordination with the Division of Environment Management and Social Development of the Department for Development Support and Management Services (DDSMS) of the United Nations Secretariat.

5. Among the other intergovernmental bodies in which general discussions on energy take place are the Commission on Sustainable Development, the Governing Council of the United Nations Environment Programme (UNEP), (in relation to energy and environment issues), the General Conference of the International Atomic Energy Agency (IAEA) (nuclear energy and related environmental issues), the Conference of the Parties (COP) to UNFCCC (energy in relation to its contribution to the emission of greenhouse gases) and the Ad Hoc Intergovernmental Panel on Climate Change (IPCC), a Panel supported by UNEP and the World Meteorological Organization (WMO) to assess scientific information on climate change and its environmental and socio-economic impacts and to formulate response strategies.

6. At the regional level, policy discussions on energy take place in all regional commissions. They have standing committees on energy or on energy and natural resources. In the Economic and Social Commission for Asia and the Pacific (ESCAP), energy matters are discussed in the Committee on Environment

and Sustainable Development. In the Economic Commission for Europe (ECE), a sustainable energy development strategy is being elaborated.

7. The statistical information on energy in the United Nations system is coordinated by the Department for Economic and Social Information and Policy Analysis (DESIPA) of the United Nations Secretariat and provided through such publications as the Energy Statistics Yearbook and Energy Balances and Electricity Profiles, while global energy trends are reported through the World Economic and Social Survey, which is issued annually.

8. In the aftermath of the United Nations Conference on Environment and Development, several implementing organizations have adjusted the policies that form the basis for their activities, often by submitting policy documents to their governing bodies. In 1996 the United Nations Development Programme (UNDP) produced the UNDP Initiative for Sustainable Energy, which provides the policy framework for its energy activities. The World Bank's energy activities are based on the objectives approved by the Bank's Board of Executive Directors. The Global Environment Facility (GEF) has "translated" the guidance it receives from the COPs of the conventions into an Operational Strategy, which was approved by the GEF Council at its meeting in October 1995. GEF is provided with scientific and technical advice by the Scientific and Technical Advisory Panel (STAP).

9. Recurrent elements in these policy documents are: promoting the design of sustainable energy paths consistent with sustainable development; promoting efficient use of energy; promoting pollution-free energy options; emphasizing projects that involve environmentally sound technologies; and helping developing countries to meet energy development objectives as a means of achieving sustainable rural development.

B. Overview of programmes and activities

10. A wide range of activities has been reported. They are indicated in the annex to this report. The main activities have been classified under energy development, energy supply and energy use. The means of implementation of the programmes and activities vary widely but, on the whole, have involved the preparation of studies and reports; technical assistance, including advisory services by experts in the specific fields; the organization of training workshops, seminars, meetings and conferences; and above all, provision of financial assistance. The magnitude of the financial resources allocated to each project varies widely from multimillion dollar financial assistance projects to allocations of a few hundred dollars by other organizations. The World Bank, UNDP, GEF and IAEA are the main providers of funds for energy projects. The regional development banks also have substantial lending programmes in support of energy sector development.

11. When it comes to funding, a distinction should be made between loans, as provided by the World Bank, and technical assistance. With a total commitment of some US\$ 3 billion per annum, the World Bank commands the largest share of activities in energy sector projects, comprising the development of fossil fuels, electricity and renewable sources of energy. Increasingly, attention is

focusing on the efficiency of energy production and use, including demand-side management in electricity development. The World Bank has promoted energy sector reform and increased competition to foster greater efficiency in energy organizations and enterprises. UNDP and the World Bank co-sponsor the Energy Sector Management Assistance Programme (ESMAP), which provides technical assistance to Governments of developing and transitional economies. The activities of UNDP, another major actor, have been in providing funding for a wide range of energy projects through indicative project funding to its programme countries, on an average of US\$ 20 million per annum, or through promoting the co-financing of joint projects with donor countries and organizations. UNDP manages the Energy Account, for which it has attracted public and private funds for pre-feasibility studies for energy projects. It has also been involved (with the World Bank and other organizations within and outside the United Nations system) in soliciting public and private funds for financing FINESSE (Financing Energy Services for Small-Scale Energy Users) projects. GEF is continuing to play a significant role in funding incremental costs of energy projects that are related to global environmental problems. IAEA also has significant activities in the field of energy - of the order of US\$ 70 million - which, besides covering the issues related to the development and operation of nuclear power plants, their fuel cycles, waste technology and nuclear safety, emphasize comparative assessment of different energy sources in terms of their economic, environmental and health impacts in the process of decision-making for electric sector planning.

12. The United Nations entities are active in all stages of the energy cycle: energy development, supply and use. Activities aimed at capacity-building, awareness-raising and technology transfer can be found throughout the three stages, either as free-standing activities or as part of a broader project. Awareness-raising and training are pursued through seminars, workshops, dissemination of information through publications, and field surveys. Technology transfer activities are mainly related to the promotion of energy efficiency or the development and commercial use of renewable sources of energy, including pilot and demonstration projects.

13. Energy planning, including electricity planning, is taken up as a sectoral activity, but in some instances, a more integrated approach is taken - for example, through the integration of energy policies into overall socio-economic development; the integrated assessment of energy and sustainable rural development; the integration of environmental, social and health concerns into energy planning and analysis; energy and environmental planning in urban areas; and an integrated resource planning approach.

1. Activities related to energy development

14. Most of the activities of a few organizations have been in providing funds for pre-feasibility studies in projects on energy production, distribution, storage and use; promoting the joint financing of energy projects; developing strategies for investment in the energy sector; and planning and providing loans for energy sector development, including electric power.

15. Many programmes at the regional level have been reported. These include implementation of regional programmes on cooperation in the field of energy; renewable resources development; promoting partnerships and business opportunities in the economies in transition; identifying and considering problems related to clean coal mining and utilization; promoting the implementation of commercial projects; and organizing expert group meetings on policies and strategies for the development of energy resources.

2. Activities related to energy supplies

16. Activities in policy development comprise the preparation of reports on the development of renewable sources of energy and on incentives for their increased use; the promotion, development and use of clean coal technology; the promotion of approaches such as co-generation, involving the private sector; improvement in least-cost planning techniques; and the promotion, development and use of nuclear power.

17. Regional projects and programmes have included analysis of gas trade and gas markets with a view to enhancing interregional trade and extension of gas markets in Europe; reports on trade as well as on enhancing interregional trade in energy; and regional studies on wood energy "hot spot maps".

18. Technical assistance activities have included assisting countries in dealing with energy supply issues; providing advisory services on the design and application of energy plans and policies in the petroleum and power sectors; support for research and development in clean coal technology; and the establishment of manufacturing facilities for renewable energy.

3. Activities related to energy use

19. Many activities in the energy sector relate to energy efficiency. In terms of policy development, studies were carried out on energy efficiency and conservation, including demand-side management, and data were collected and published on energy production, trade and use. Technical assistance was provided in the demonstration and dissemination of energy-efficient industrial technologies. Institutional and capacity-building activities have included the development and implementation of sustainable energy strategies, demand-side management and energy efficiency standards, and the development and application of energy intensity indicators, energy labelling systems, the efficient management of energy institutions and enterprises through operational performance, energy efficiency in human settlements, environmental impact assessment and appropriate energy and electricity pricing.

C. Coordination of activities

20. From the information available, there appears to be a certain degree of cooperation and coordination of activities. DESIPA has continued cooperation and coordination with entities within the United Nations system in the collection, analysis and application of energy data and information in such

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areas as the Statistical Commission Working Group on International Statistical Programmes and Coordination and the Administrative Committee on Coordination (ACC) Subcommittee on Statistical Activities and in addressing energy issues in the context of the World Economic and Social Survey.

21. DDSMS is cooperating with the World Bank, UNDP and GEF in the implementation of projects at the national, regional and global levels. It is also cooperating with UNDP and ESCAP in the implementation of sustainable energy projects such as the Enhancement of Capacity for Sustainable Energy Services for Rural Development in Asia.

22. The International Research and Training Institute for the Advancement of Women (INSTRAW) conducts research studies, prepares training materials and organizes training activities in close collaboration and coordination with the regional commissions, the International Labour Organization (ILO) Turin Training Centre, DDSMS and other entities within and outside the United Nations system.

23. DPCSD is cooperating with other entities of the United Nations system in the preparation of reports for the Committee on New and Renewable Sources of Energy and on Energy for Development, the Commission on Sustainable Development and other intergovernmental bodies.

24. UNDP and the World Bank have, over the years, been cooperating in ESMAP, with the latter implementing the projects. UNDP, UNEP and the World Bank are the implementing agencies for the GEF, which has been providing incremental costs for projects that have global environmental benefits. The World Bank, UNDP and a number of other entities within and outside the United Nations system are jointly funding the FINESSE programme, in which UNDP is very actively involved.

25. At the regional level, ECE has been cooperating with many other entities within and outside the United Nations system in the implementation of Energy Efficiency 2000 projects. ESCAP is executing the UNDP-funded Programme on Asian Cooperation on Energy and the Environment (PACE-E). UNDP is also cooperating with the World Bank Asia Alternative Energy Unit in a project to mainstream renewable energy and energy efficiency activities into the lending operations of the World Bank in the Asia and the Pacific region.

26. The United Nations Educational, Scientific and Cultural Organization (UNESCO) initiated the high-level World Solar Summit Process (WSSP), with the objective of promoting the development and deployment of renewable energy technologies as a contribution to sustainable development. The World Solar Summit Process was conducted with the active support of several partners, among them ECE, the United Nations Industrial Development Organization (UNIDO) and the International Atomic Energy Agency (IAEA). Under the leadership and guidance of the World Solar Commission, composed of 16 heads of State or Government, WSSP culminated successfully in the World Solar Summit, held at Harare, Zimbabwe in September 1996. The Summit adopted the Harare Declaration on Solar Energy and Sustainable Development and the outline of the World Solar Programme, 1996-2005, which is currently being completed. An inter-agency meeting for consultations took place in Paris in December 1996 as part of the follow-up to the World Solar

Summit to discuss the contribution of the United Nations system to the development and implementation of the World Solar Programme.

27. IAEA is coordinating the joint inter-agency project entitled "Databases and Methodologies for Comparative Assessment of Different Energy Sources for Electricity Generation" (DECADES) in cooperation with a number of regional commissions, the World Bank, UNIDO, WMO and other international organizations. The inter-agency DECADES project being pursued by IAEA is emphasizing comprehensive comparative assessment of the economic, environmental and health impacts of the full energy chains of different electricity generation options in support of sustainable energy development.

28. WMO is cooperating with UNEP in the work of the Ad Hoc Intergovernmental Panel on Climate Change. Meanwhile, the Food and Agriculture Organization of the United Nations (FAO) has been cooperating with the Economic Commission for Latin America and the Caribbean (ECLAC), ESCAP, the World Bank and other international organizations, regional organizations and development banks in many rural development projects. UNIDO is supporting the work of the UNFCCC secretariat through participation in the teams undertaking in-depth reviews of the Annex I National Communications to the COP.

II. ROLE OF ENERGY IN MEETING THE CHALLENGES OF SUSTAINABLE DEVELOPMENT

29. Energy plays a key role in achieving the interrelated economic, social and environmental objectives that lead to sustainable development. In addition, from a national security point of view, a secure and stable energy supply is an important consideration. Peace and international stability are preconditions for sustainable development. The current approach to energy policy worldwide, which is characterized by a strong emphasis on energy supply, without regard to its social, economic and environmental consequences, does not meet the requirements of sustainable development.

30. An energy path that contributes to sustainable development requires a transition from a supply-driven approach to one that pursues energy efficiency, particularly with regard to energy end-use and meeting demand through environmentally sound energy services. This implies that all actors - Governments, the international community, the private sector and non-governmental organizations - should pursue: (a) efficiency in energy production, transmission, distribution and, in particular, energy end-use; (b) a shift towards energy sources and technologies with reduced environmental impact, including emissions of greenhouse gases; and (c) promoting, developing and implementing policies and programmes, as appropriate, designed to ensure their adoption.

31. The current pace of growth in world energy demand, even with a strong emphasis on efficiency, is expected to lead to a substantial increase in aggregate commercial energy demand - under 2 per cent per year between 1995 and 2020.⁴ The potential consequences of this scenario are profound, if the growth in energy demand is not met in a sustainable manner. Considering the long lead times involved in the implementation of energy efficiency measures and in the

effective penetration of renewable energy sources in the global energy supply mix, the current trends in power-market restructuring and liberalization worldwide, and the long lifetime of capital equipment, a reappraisal of energy systems with an emphasis on modern technologies is an urgent priority.

32. The level of economic and social development strongly influences the amount and type of energy needed, and at the same time the developments in the energy sector affect economic growth. In developing countries sharp increases in energy services are required to improve the standard of living for their growing populations. The increase in the level of energy services that accompanies growth in per capita GDP will have a beneficial impact on poverty alleviation by increasing employment opportunities and improving transportation, health and education.

33. Many developing countries, in particular the least developed among them, face the urgent need to provide adequate, modern energy services, especially electricity, to billions of people in rural areas. This requires significant financial, human and technical resources. International cooperation should be strengthened to assist the developing countries in meeting their goals and objectives while at the same time ensuring that energy development and use are undertaken in an environmentally sound and sustainable manner. According to a recent UNDP publication,⁵ there are, today, good opportunities in remote rural areas of developing countries for using renewable sources of energy at competitive costs to meet the small-scale mechanical or electric power needs of the individual household, farm or village. Advanced renewable energy technologies, in particular modern biomass technologies, which could become widely available in one or two decades, offer the potential for providing energy in rural areas at very competitive costs. Industry would thereby be attracted to rural areas and rural jobs created both in the labour-intensive bio-energy industries and in the industries that low-cost bio-energy would attract to rural areas.

34. Income growth as well as population growth make it imperative to enhance energy efficiency greatly. Research done in the academic and NGO communities has demonstrated that increases in efficiency ranging from 50 to 95 per cent can be achieved with currently available technology and knowledge. Efficiency improvements reduce energy costs (including the costs related to the import of energy sources), extend energy resources and reduce environmental impacts. The benefits accrue to developed as well as developing countries. Although the current use of energy in developing countries is one tenth that of the countries that are members of the Organisation for Economic Cooperation and Development (OECD), it is expected to grow at a much faster rate to meet the requirements for industries, buildings, transport systems and households in the developing countries.

35. Increased energy use in industrialization is a concomitant phase of the development process, entailing urbanization, electrification and the building of other basic infrastructure - all of which serve to raise energy intensity in all sectors of the economy. A significant contribution towards reducing energy intensity in developing countries will come through accelerated investment in energy-efficient technologies that reduce both energy consumption and the use of raw materials with high embodied energy. A high rate of investment speeds up

technological change, since adding new capital to existing stock or replacing the old stock increases the proportion of output produced with energy-efficient technologies. A conscious policy of promoting the adoption and diffusion of energy-efficient technologies and practices is essential towards this end.

36. Current energy prices favour the use of conventional energy sources over renewable energy sources. At the same time, current practices in fuel pricing do not encourage energy efficiency. In most cases there is little or no regard for the external social and environmental costs of the supply. Subsidies in the energy sector for conventional energy sources and nuclear power tend to hamper widespread development and application of renewable energy sources.⁶ Policy changes that will lead to the full internalization of environmental costs in prices through the use of economic and fiscal instruments and the removal of permanent subsidies are required if a sustainable energy path is to be pursued.

37. Women have an essential role to play in achieving sustainable energy programmes, with an emphasis on demand-side management and increased use of renewable energy sources. To enable women to participate more easily in energy programmes and projects, it is crucial that women's needs and involvement in both urban and rural areas be given due consideration in the planning of energy services. In urban areas, women's energy needs for domestic as well as economically productive activities need to be given due consideration.⁷

38. The generation, transmission, distribution and use of energy contribute to local, regional and global environmental problems. Extraction and production of energy resources contribute to natural resource depletion and deforestation. Transportation of energy can lead to oil spills, marine pollution and other accidental releases. Transformation activities such as refining can emit hazardous pollutants. Consumption contributes to air and water pollution, aggravation of the greenhouse effect and harmful by-products, including solid and nuclear wastes.

39. Fossil fuels (coal, oil and natural gas) will continue to dominate the energy supply situation for many years to come in both developed and developing countries. What is required then is to reduce the environmental impacts of their continued development and use through better design and management and through the introduction of both voluntary and mandatory instruments for the reduction of local health hazards and environmental pollution as well as emissions of greenhouse gases. For coal utilization, there is a need for further research, development and application of improved technologies for the removal of oxides of sulphur and nitrogen and also for gasification. This will require considerable resources - human, material and, more important, financial - as well as scientific knowledge and know-how.

40. The development and use of natural gas is increasingly being advocated, because it emits lower levels of greenhouse gases and has a less adverse environmental impact. In developing countries, the main problem is an inadequate supply of natural gas. Where the supplies exist, the distribution networks are especially weak and in many cases non-existent. IPCC has stated that CH₄ emissions from natural gas venting, as well as leakage from pipeline and distribution systems, are significant.⁸ Flaring and venting of natural gas has been estimated to be about 5 per cent of world natural gas production.⁹

41. The share of traditional biomass and hydropower, the renewable energy sources currently used in sufficient quantities to contribute significantly to world primary energy demand, will continue to increase in the energy supply mix, although growth in hydropower development will be constrained by environmental concerns. Biomass is consumed at an annual rate of 47 EJ¹⁰ to 55 EJ,¹¹ mainly for cooking and heating in developing countries, and also in small-scale industry and with some use at larger scales. In the Renewables-Intensive Global Energy Scenario (RIGES),¹² it is projected that the commercial biomass contribution will be 145 EJ by 2025 and 206 EJ by 2050; in this scenario, the use of modernized biomass is expected to grow rapidly (10 per cent per year between 1990 and 2025) because of the multiple benefits it offers. Contribution by such renewable energy sources as solar thermal and photovoltaic, wind and geothermal is also projected to increase and provide a significant share to world commercial energy consumption.

42. During recent decades, there has been a decrease in the acceptance of nuclear power, especially the building of new power plants. A review of opinion surveys concludes that public concerns about nuclear energy focus on the following issues: doubt about economic necessity, fear of large-scale catastrophes and fears regarding the storage of nuclear waste and the misuse of fissile material. Nuclear power expansion has stopped in most countries. The continuing concern with regard to safety and proliferation issues will constrain nuclear power development.¹³

43. However, increased use of nuclear energy is receiving added attention in the light of the growing concern about greenhouse gas emissions associated with the use of fossil fuels. According to IPCC, nuclear energy could replace baseload fossil fuel electricity generation in many parts of the world if generally acceptable responses can be found to concerns regarding reactor safety, radioactive-waste transport and disposal, and nuclear proliferation.¹⁴

44. The development and use of energy is highly capital-intensive. Estimates have been made of capital requirements for the development and use of energy resources in developing countries. Such estimates are by no means exhaustive, but the indicative figures clearly express the enormity of the requirements. The World Bank, in a study of electric power expansion programmes in 70 developing and transition economies, estimated the average annual growth rate of electricity demand in developing countries to be about 6.6 per cent between 1989 and 1999. This would require raising total generating capacity to 855 gigawatts in 1999 at a cumulative cost of \$745 billion (in 1989 United States dollars or almost \$1 trillion in current dollars), a large part of which will be in foreign exchange.¹⁵

45. The World Energy Council (WEC) estimates that in the period 1990-2020, investments in the electric power sector in developing countries will range between \$2.4 trillion and \$4.4 trillion in 1990 United States dollars, accounting for 64-79 per cent of all energy investments in developing countries in the same period. This translates to a range of \$80-\$150 billion per year in the electricity sector alone. Even in the ecologically driven estimate - the one in which all the suggested environmental, global warming and health factors are taken into account - the annual requirements would still be very high. There are also many other competing requirements for financial resources.¹⁶

46. In the World Economic and Social Survey, 1996, a scenario was developed for the purpose of estimating the probable magnitude of future electric power needs in developing countries, in which - even at a conservative growth rate of 6 per cent a year - developing countries will require an additional 1,170 gigawatts of installed electricity-generating capacity during the period 1994-2010. Estimating an average overall system cost of about \$1.6 billion per gigawatt, total investment would be about \$1.87 trillion, for an average of about \$117 billion a year (nearly 2.5 per cent of GDP). In addition, substantial investment will be needed to replace ageing generating plants, as well as investment to improve efficiency and reduce environmental impacts of fossil fuel use.¹⁷

47. Meeting the investment requirements of the energy sector in developing countries will require tailoring a financing strategy to different country circumstances and policy priorities. Common to nearly all countries, however, is the considerable scope for cost-recovery from end-users by increasing prices to cover long-term marginal cost. The needs of the poor can be protected by charging low "lifeline rates" to households and somewhat higher rates to other users. This could release subsidies, estimated to be at least \$100 billion per year (nearly equal to the annual cost of investment), and at the same time reduce growth in demand, which tends to cause capacity requirements to be overestimated.¹⁸ Similarly, improving maintenance, rehabilitation and upgrading of existing power plants can greatly reduce the marginal cost of expanding service. The World Bank has estimated that electric power delivered to end-users equals only about 40 per cent of installed capacity in developing countries, compared to over 80 per cent of installed capacity in developed countries.¹⁹ Establishing the principle of full (or nearly full) cost-recovery would permit much greater recourse to foreign financing as bond financing for either public or private national enterprises operating on fully commercial principles within an adequate regulatory environment. In these circumstances, foreign direct investment can be tapped. Since such opportunities are likely to be less available to the least developed countries, they will continue to need to rely on official development assistance (ODA) for at least a part of their energy sector financing needs. Rural electrification, because of the much higher unit costs of supply, will also need to rely on public subsidies, which may also be assisted by ODA. GEF can be utilized to meet the incremental costs of energy projects designed to reduce impacts on global warming.

III. ASSESSMENT OF THE LINKAGES BETWEEN CURRENT ENERGY ACTIVITIES AND SUSTAINABLE DEVELOPMENT

48. The activities of many organizations have, over the years, underscored the relation between energy and development and, more recently, energy and sustainable development. The policies and mandates, both before and especially since the United Nations Conference on Environment and Development, have espoused this trend. The United Nations Conference on New and Renewable Sources of Energy (Nairobi, 1981) has had a significant impact on the programmes and activities of many organizations; many introduced or expanded their programmes and projects in the field of new and renewable sources of energy, as part of the implementation of the Nairobi Programme of Action for the Development and Utilization of New and Renewable Sources of Energy, at a time when the price of

oil had risen to an all-time high. However, interest in new and renewable sources of energy subsequently waned substantially, especially beginning in the mid-1980s, as a result of the decline in the price of oil.

49. Since the late 1980s, interest in new and renewable sources of energy has begun to surge again, given the emerging concern about the environmental impacts of the growing use of fossil fuels, including their contribution to the emission of greenhouse gases, and general awareness of the need for sustainable energy systems. This trend is best reflected in General Assembly resolution 46/235, in which, in establishing the Committee on New and Renewable Sources of Energy and on Energy for Development, the Assembly indicated that in addition to implementing the Nairobi Programme of Action, the Committee would consider energy in relation to the environment. Many entities have been pursuing this mandate. With the adoption of General Assembly resolution 47/190 on the report of the United Nations Conference on Environment and Development, in which the Assembly endorsed Agenda 21, and the adoption and entry into force of UNFCCC, the stage was set for linking energy and sustainable development. United Nations organizations have adjusted their programmes and projects in varying degrees to reflect the objectives of Agenda 21.

50. It is clear that a sustainable energy path, challenging as it may be, demands a concerted effort by all actors concerned, including the United Nations system. From chapter I and the annex to this report, it is clear that the United Nations is involved in a broad range of activities in response to the demands and priorities of the countries that they support. In general terms, these activities do not seem to be contradictory to a sustainable energy path. The increasing attention to energy efficiency and the related demand-side management and pricing policies are proof of positive developments. In addition, several organizations contribute to the promotion and dissemination of clean energy technologies, including clean coal technologies.

51. Support for the further introduction and application of renewable energy sources is increasing, with a special emphasis on improving access to energy services by the rural population. In the area of capacity-building and institutional development, energy planning activities are increasingly linked to the broader context of socio-economic or environmental planning and plan implementation.

52. Of special importance, given the level of the activities, are the following developments. The operation of GEF has placed strong emphasis on environmentally sound technologies - in particular, those related to reduced emission of greenhouse gases into the atmosphere. This tends to favour the development of renewable sources of energy. The World Bank, through its loans and technical assistance programmes, has become the single largest source of funding for environmental programmes and projects. It is now integrating social and environmental dimensions into all its operations, including energy. Consequently, all energy projects are screened for social and environmental impacts. The organization is playing a key role in addressing such issues as pollution from the development and use of energy and the development and use of renewable sources of energy. As part of an effort to bring development cooperation activities into line with sustainable human development, UNDP places special emphasis on sustainable energy through consistent pursuit of more

efficient energy patterns and support for major shifts towards renewable sources of energy. It links its energy projects to the overall objectives of the programmes related to poverty alleviation, gender equality and environmental sustainability. The Food and Agriculture Organization of the United Nations (FAO) continues to stress the need to mobilize energy inputs to fulfil the needs of the food production chain in a sustainable manner. The UNESCO-initiated World Solar Summit has drawn considerable political attention to the potential of renewables, and its regional preparatory process has developed a programme portfolio of several hundred projects.

53. The activities of the United Nations and its organizations, although modest in financial terms compared to the overall investment in the energy sector, have an important role as catalysts and models for new developments that meet the criterion of sustainability. It is evident that the United Nations system has a large interdisciplinary potential in the energy field that can be effectively used to support sustainable energy development in developing countries and economies in transition. So far, as already indicated by the Committee on New and Renewable Sources of Energy and on Energy for Development²⁰ and confirmed by the present report, no common strategy has been developed that would serve as a reference framework for the system as a whole and provide synergy to the activities. Given the enormous challenges of a sustainable energy scenario, the development and adoption of such a common strategy could increase the coherence and effectiveness of United Nations activities in pursuit of energy systems that support sustainable development.

IV. ASSESSMENT OF COOPERATION AND COORDINATION WITH REGARD TO ENERGY ACTIVITIES

54. On the basis of the information available, it may appear that the level of cooperation and coordination with regard to energy activities is encouraging. In fact, however, such cooperation and coordination seem to be rather ad hoc. In terms of general policy development, a common strategy is missing. Although energy issues could be addressed in the Inter-Agency Committee on Sustainable Development, there is no systematic inter-agency dialogue. Inter-agency involvement in the preparation of reports for the Committee on New and Renewable Sources of Energy and on Energy for Development and participation in the meetings is scattered.

55. Activities in energy statistics are adequately coordinated by DESIPA and, at the intergovernmental level, by the United Nations Statistical Commission.

56. The establishment of GEF has led to enhanced and structured cooperation among the World Bank, UNDP and UNEP and has involved other United Nations entities in the implementation of specific projects.

57. UNDP and the World Bank, as the two major funding organizations, have been cooperating over the years in the field of renewable energy programmes, mainly through ESMAP. UNESCO, together with a number of partners within and outside the United Nations system, has secured strong and high-level political support for the wider use of renewable energies, both through the preparatory process for the World Solar Summit and as a result of the Summit itself. This kind of

cooperation may form the basis for a broader, system-wide programme on renewable sources of energy. The World Solar Programme that emerged from the UNESCO-initiated World Solar Summit, which has received high-level political support, could constitute an important element of such a system-wide programme, in which other entities outside the United Nations may also wish to take part. ESCAP, IAEA, the World Bank, UNIDO and WMO are cooperating in the IAEA-coordinated inter-agency DECADES project, aimed at enhancing capabilities for comparative assessment of different energy sources in the process of planning and decision-making for the electricity sector in support of sustainable development.

58. At the regional level, the regional commissions are well placed to coordinate policy development and system-wide involvement in implementation. This seems to be well under way in ECE and ESCAP. There is, however, scope for cooperation between the regional commissions and regional development banks.

59. At the country level, coordination is pursued in various manners in response to the local situation. It may benefit from a common strategy and enhanced sharing of experiences.

V. RECOMMENDATIONS AND PROPOSALS FOR FUTURE ACTION

60. It is essential that energy systems worldwide contribute to sustainable development. This requires major changes in the current energy systems. As indicated in section II of this report, that can only be achieved if all actors involved - Governments, international capital markets, energy investors, industry, international organizations, scientific and research institutes, and non-governmental organizations - contribute to a common goal.

A. Towards a common strategy

61. The United Nations, although a modest partner in terms of its financial contribution to energy investment, has an important role to play in developing an energy strategy that will provide a reference framework for the energy-related activities of the United Nations system, including the Bretton Woods institutions. Such a strategy would promote a balanced and mutually reinforcing approach to economic, social and environmental aspects of sustainable energy development. It would foster partnership for sustainable energy development with relevant actors outside the United Nations system, particularly with non-United Nations intergovernmental organizations dealing with energy and the private sector.

62. The strategy would take into account the energy-related outcomes of all major conferences, from the United Nations Conference on New and Renewable Sources of Energy in 1981 to the United Nations Conference on Human Settlements (Habitat II) in 1996, the ongoing discussions in the context of UNFCCC and other relevant international meetings, such as the World Solar Summit (Harare, 1995), the International Symposium on Electricity, Health and the Environment: Comparative Assessment in Support of Decision-making (Vienna, 1995), the Senior Expert Symposium on Electricity and the Environment (Helsinki, 1991) and the

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Committee on New and Renewable Sources of Energy and on Energy for Development, as well as recent policy documents and strategies developed by various United Nations organizations. The strategy would provide for a more coherent system-wide response to their implementation.

63. The strategy would build on the experience gained so far in inter-agency cooperation and coordination in the field of energy and would suggest ways and means of enhancing its effectiveness in the future.

64. Specific proposals on such a common approach, including its possible scope and format, may be elaborated over a given time-frame through inter-agency consultations (which may involve, as appropriate, relevant non-United Nations actors) and subsequently submitted for consideration and approval by the Economic and Social Council and the General Assembly, through the Committee on New and Renewable Sources of Energy and on Energy for Development and the Commission on Sustainable Development. The specific modalities for the elaboration of proposals on such a common approach should take into account the availability of financial and staff resources.

B. The role of the Committee on New and Renewable Sources of Energy and on Energy for Development

65. Currently the Committee on New and Renewable Sources of Energy and on Energy for Development is the only body in the United Nations that addresses all aspects of the energy discussion. The Committee should continue to play a useful role in furthering United Nations policy discussion in the field of energy after 1997. However, the modalities of the Committee's functioning could be adjusted in order to enhance its effectiveness. This could include:

(a) Better representation of Governments; currently not all regions have designated their representatives;

(b) Better dissemination of reports;

(c) Better participation of the organizations of the United Nations system, including the regional commissions, in the work of the Committee, including the preparation of reports;

(d) Establishment of links between the Committee and non-United Nations organizations dealing with energy, such as the International Energy Agency (IEA) and the World Energy Council (WEC);

(e) Changing the Committee's pattern of reporting, so that it will report to the Economic and Social Council through the Commission on Sustainable Development (which is already the case for some Committee reports) with a view to ensuring greater integration of the results of the Committee's work in the sustainable development discussion; there is also a need to ensure that the Committee's work programme takes into account relevant requirements of the Commission on Sustainable Development.

C. Improving inter-agency cooperation

66. It is essential to promote more effective arrangements for inter-agency coordination and cooperation in the field of energy at the global, regional and field levels. This could include:

(a) Making energy a recurrent item on the agenda of the Inter-Agency Committee on Sustainable Development (IACSD) and ensuring linkages with the energy-related aspects of the work of other ACC bodies, including the task forces established to follow up on recent global conferences;

(b) Convening ad hoc meetings of relevant organizations, preferably back-to-back with or in connection with other meetings (such as those of IACSD or the Committee on New and Renewable Sources of Energy and on Energy for Development) in order to:

- (i) Elaborate a common approach as suggested in paragraphs 61-64 above;
- (ii) Discuss arrangements related to the provision of system-wide support to policy-making processes, including in the Committee on New and Renewable Sources of Energy and on Energy for Development and the Commission on Sustainable Development;
- (iii) Promote greater policy coherence between intergovernmental and governing bodies throughout the United Nations system;
- (iv) Exchange information and discuss lessons learned from various projects and activities;
- (v) Promote data comparability;

(c) Discussing specific arrangements aimed at enhancing the United Nations system's capacity for information exchange in the field of energy. This may include the establishment of an electronic database on energy-related activities, programmes and experiences, which, eventually, may be linked with other relevant databases that exist in the United Nations system.

Notes

¹ Official Records of the Economic and Social Council, 1996, Supplement No. 8 (E/1996/28), chap. I, sect. B, decision 4/15, para. 19.

² Official Records of the General Assembly, Fifty-first Session, Supplement No. 3 (A/51/3 (Part II)), chap. V, sect. B.1, resolution 1996/44, para. 1.

³ Report of the United Nations Conference on Environment and Development, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II, chap. 9, para. 9.9.

⁴ Report of the Secretary-General on the main trends in sustainable development (E/CN.17/1997/3).

⁵ J. Goldemberg and T. B. Johansson, eds., Energy as an Instrument for Socio-economic Development (New York, UNDP, 1995).

⁶ It has been estimated that in non-OECD countries alone subsidies for conventional energy sources and nuclear power amount to \$270-330 billion per year. See A. de Moor, "Subsidies and sustainable development; proceedings of the Third Expert Group Meeting on Financial Issues of Agenda 21" (New York, United Nations, 1996).

⁷ INSTRAW, in cooperation with the ILO/Turin Centre, prepared a multimedia training package entitled "Women and new and renewable sources of energy". The training package is aimed at different target groups: development planners, senior officials, engineers, managers of energy programmes, representatives of NGOs and community workers at national, regional and international levels.

⁸ Climate Change 1995; Impacts, Adaptations and Mitigation of Climate Change; Scientific-Technical Analyses (Cambridge, Cambridge University Press, 1996), sect. 19.2.2.1.

⁹ The estimated total world natural gas production in 1995 was about 2,120 billion cubic metres, excluding gas flared or recycled (BP Statistical Review of World Energy, June 1996).

¹⁰ New Renewable Energy Resources - A Guide to the Future (London, World Energy Council, 1994).

¹¹ D. O. Hall and others, "Biomass for energy: supply prospects", in Renewable Energy: Sources for Fuel and Electricity, T. B. Johansson and others, eds. (Washington, D.C., Island Press, 1993).

¹² T. B. Johansson and others, eds., op. cit.

¹³ Climate Change 1995 ... (sect. 19.2.4).

¹⁴ "Policies and measures for mitigating climate change", (technical paper prepared by IPCC, December 1996).

¹⁵ E. Moore and G. Smith, "Capital expenditures for electric power in the developing countries in the 1990s", Industry and Energy Working Paper No. 21 (Washington, D.C., World Bank).

¹⁶ R. K. Pachauri and others, "Financing energy development: the challenges and requirements of developing countries", Round Table Session 4, "Financing Energy Development - Winners and Losers?", Proceedings of the Sixteenth Congress of the World Energy Council (Tokyo, 8-13 October 1995).

¹⁷ World Economic and Social Survey, 1996 (United Nations publication, Sales No. E.96.II.C.1).

¹⁸ Ibid.

¹⁹ World Development Report, 1994 (New York and Oxford, Oxford University Press, 1994).

²⁰ See Official Records of the Economic and Social Council, 1996, Supplement No. 4 (E/1996/24).