

United Nations



Consolidated Report of Energy Activities

Ad Hoc Inter-Agency Task Force on Energy
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<http://www.un.org/esa/sustdev/iaenr.htm>

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I. Introduction

The United Nations undertakes a wide range of activities in the area of energy with the overall objective of promoting sustainable development by integrating economic, social and environment aspects of energy use. Activities comprise the implementation of projects, the provision of technical advice to developing countries and the support of the intergovernmental process at the United Nations. Within this broad framework, efforts have been made to focus on the key issues identified by the ninth session of the Commission on Sustainable Development (CSD9), namely, accessibility of energy, energy efficiency, renewable energy, advanced fossil fuel technologies, nuclear energy technologies, rural energy, energy and transportation, technology transfer, capacity building, mobilization of financial resources and international and regional cooperation.

Work the area of energy is the responsibility of a number of UN agencies and programmes with activities focused according their individual mandates. The Ad Hoc Inter-agency Task Force on Energy coordinates these efforts and provides a vehicle for cooperation and coordination of work undertaken on energy throughout the United Nations system. The Task Force contributed to the preparations for CSD9 and its preparatory meetings by preparing a compendium of case studies based on projects implemented at the country level, contributing to documentation, preparing detailed background documents, and elaborating on a common system-wide approach to energy within the UN system. This approach, Agenda 21 and the outcome of the ninth session of the Commission on Sustainable Development are used as overall guides to its work.

This report is intended to highlight the synergies and visions of the United Nations Secretariat and its agencies and programmes in the area of energy and illustrate current activities especially as they relate to the outcome of CSD9 and preparations for the World Summit on Sustainable Development to be held in Johannesburg, 26 August – 4 September 2002. Recently the Task Force participated in the Multistakeholder's Roundtable on Energy and Sustainable Development held in New Delhi, 21-23 January 2002 which has contributed to preparations for the World Summit on Sustainable Development. The New Delhi Communiqué is found in the Annex of this document.

Information on individual entities, agencies and programmes as well as other cooperating institutions are provided here and additional information is available at:

<<http://www.un.org/esa/sustdev/iaenr.htm>> or upon request by writing to abdallak@un.org.

II. United Nations Entities and Programmes

A. Department of Economic and Social Affairs (DESA)

The Department of Economic and Social Affairs (DESA) undertakes activities in the area of energy in support of the Commission on Sustainable Development and the Committee on Energy and Natural Resources for development as well as implementing energy projects and providing technical advisory services. These activities are undertaken to promote sustainable development as outlined in Agenda 21 with a focus on energy, environment and social development and to furthering the development and use of new and renewable sources of energy, promoting efficiency of energy use as well as enhancing energy exploration and development in developing countries and developing national capacity for energy project evaluation and analysis of energy technologies.

Its activities include monitoring and analyzing global energy trends and prospects and their impact on the environment; monitoring and analyzing developments in new energy technologies for both conventional and new and renewable sources of energy; preparing studies on these topics for consideration by intergovernmental bodies; dissemination of relevant information; rural energy and energy and transport. These activities are aimed at increased understanding of the environmental and socio-economic impact of various policy options and strategies.

With the goal of operationalizing Agenda 21, DESA has an active program of technical cooperation with developing countries. With funding from UNDP, GEF, UNFIP, bilateral partners, the World Bank and others, the Department is implementing energy efficiency and renewable energy projects to help developing countries in their efforts to find more sustainable pathways of development. The strategic approach adopted for energy efficiency incorporates several key lines of action, including: cleaner production processes for industry, transportation energy efficiency, appliance and lighting standards, energy efficient building codes, integrated resource planning and demand-side management for electric utilities, and recovery of energy from the urban waste stream. The objectives of DESA's technical cooperation activities in renewable energy are: 1) to promote the commercialization of renewable energy systems through appropriate policies, incentives and market-based measures; 2) to promote the role of entrepreneurs and market intermediaries in the diffusion of renewable energy applications; 3) to engender community involvement, including women, in the management of decentralized energy systems; 4) to explore innovative credit arrangements for renewable energy applications; and 5) to share information on standards and best practises for renewable energy equipment and its use.

DESA provides support to the intergovernmental process, in particular to the Commission on Sustainable Development which considered the issue of energy at its ninth session held in April, 2001. In preparation for those deliberations an Ad Hoc Intergovernmental Group of Experts on Energy and Sustainable Development was formed to provide guidance to the CSD, and its two sessions were supported by DESA. CSD9 identified and elaborated on key issues in the area of energy and made recommendations in the area of energy to further efforts at achieving sustainable development. DESA also provides support to the Committee on Energy and Natural Resources for Development which comprises experts in energy and water from developed and developing countries.

DESA is active in elaborating on key energy issues for on energy and sustainable development as well as on issues related to energy/transport. It coordinates UN entity/programme and agency activities in support of discussions on energy and sustainable development undertaken by the international community and facilitates coordination and cooperation on energy activities throughout the United Nations system in general.

B. Regional Commissions

1. Economic Commission for Europe (ECE)

Bearing in mind the specifics of the region, the current ECE programme in the field of energy is aiming to overcome two fundamental challenges; namely: (a) the transition to a more sustainable path for the production and use of energy; and (b) the fuller integration of the energy economies and energy infrastructures of countries in the region. In this respect, the activities will continue, in order of priority, to emphasize the development and implementation of sustainable energy policies and strategies; the improvements in energy efficiency, especially in economies in transition; the efficient extraction, transport and use of natural gas; the implementation of environmentally- sound coal mining and use technologies; and the further interconnection of electric power infrastructures. Increased emphasis is being now given to energy-related environmental issues, in particular with respect to the use of coal, as well as to increasing the use of new and renewable energy sources. Activities undertaken by ECE are being annually reviewed and updated by the Committee on Sustainable Energy.

The ECE Committee on Sustainable Energy play a catalytic role in ECE region by promoting regional initiatives, preparing conclusions and recommendations on sustainable energy policies and strategies and that for the benefit of all players in the market, at first to policy making. In this respect, the Committee decided to create a Task Force, with a mandate to provide a regional input to the preparation of CSD-9 and develop a programme for implementing the output of CSD-9 at regional level; the Task Force have already identified the Key Issues from regional perspectives and decided to further focus on two sustainable issues, namely: (a) energy intensity and efficiency; and (b) energy pricing, subsidization, internalization of externalities.

The purpose of the sub-programme on energy efficiency is to reduce the energy efficiency gap between actual practice and best technologies, in particular that, between transition countries and market economies. That is technical assistance in nature and has focused on international cooperation, building institutional capacities and partnership in Central/Eastern Europe, and promotion of investment

The ECE also focuses on efficiency in extraction, transport and use of natural gas and the promotion of clean coal production by promoting an exchange of information and preparation of studies, elaboration of international maps, promotion of natural gas to non-power sectors; and the provision of technical assistance to countries with economies in transition. The ECE also promotes an extension of the European electricity networks by fostering an exchange of information and undertaking feasibility studies.

The ECE Committee on Sustainable Energy is a Parent Body of all ECE activities in the field of energy. It was set up in 1997 by the Decision of the Commission with a mandate to promote sustainable energy policies in the ECE region. The activities are being carried out through the United Nations regular budget and extra-budgetary resources in the field of gas and energy efficiency. The Committee has the following working organs: (a) Working Party on Gas, with two Ad hoc Groups of Experts, both on the regular budget, and a Gas Centre fully financed by Gas companies; (b) Steering Committee on Energy Efficiency 21 Project; (c) Ad hoc Group of Experts on Coal and Thermal Power; and Ad hoc Group of Experts on Extension of European Electricity Interconnection. The activities of last two Ad hoc Groups are also supported by the regular budget. Most of normative activities are being carried out under the Committee on Sustainable Energy.

2. Economic and Social Commission for Western Asia (ESCWA)

The energy sector has a vital importance for the economic and social development in the ESCWA member states, particularly due to its effective contribution to GDP as well as to the energy supplies to all economic sectors. However, there is an urgent need in the ESCWA member states to move towards more sustainable development since the energy sector is characterised by unsustainable energy use patterns with high-energy intensities. Several adverse environmental impacts from the energy sector exist and are due to the exploration, production and distribution processes. Thus, the energy sector has to meet two policy challenges: the first is the need for a transition to more sustainable production and use of energy; and the second involves the building and strengthening of links in the field of energy among ESCWA member States by promoting cooperation in the areas of energy efficiency, renewable energy and the harmonisation of the relevant legal, regulatory and policy frameworks.

To achieve such challenges, energy sector policies and plans should be developed directed to 1) upgrading energy use efficiency; (2) promoting the use of cleaner fuels and technologies; (3) promoting a cost effective mix of fossil and renewable energy sources; and (4) mitigating to the maximum possible the environmental impacts of the energy sector.

Since 1996 ESCWA has emphasised the need for more sustainable energy patterns and current and future programmes are placing particular emphasis on the issue of sustainability. The main themes and programme activities are 1) Promotion of Renewable Energy Applications, 2) Options for Energy Conservation, Efficiency and Greenhouse Gas Abatement, and 3) Energy Supply Options For Water Desalination. Future areas of focus are envisioned as achieving better management of energy, water and environment through integrated approaches that can positively impact sustainable development in the region. This will be accomplished by promoting policies and measures that enhance the role of energy resources in the regions' sustainable development through the use of environmentally friendly technologies; enhancing institutional and human resources capacities in the related areas; assessing and/or updating structural reform for the management of energy; and assisting member countries in their efforts to enhance intra-regional cooperation in the field of energy and the protection of the environment.

ESCWA also publishes technical and analytical reports on an annual and ad hoc basis and undertakes expert group meetings on specific energy topics as deemed necessary. It is guided in its activities by the ESCWA Committee on Energy which meets periodically to review work and determine priorities.

3. Economic and Social Commission for Asia and the Pacific (ESCAP)

Access to adequate, reliable and affordable energy remains of utmost importance and priority concern in the Asian and Pacific region both for economic and social development including poverty alleviation. This conclusion came out very strongly from the High Level Regional Meeting on Energy for Sustainable Development, held in Bali, Indonesia, 21-24 November 2000 in preparation for the regional perspectives as an input to the CSD-9. The Meeting was organized by ESCAP in partnership with DESA, UNDP and the Government of Indonesia. The Ministers and the Heads of the delegations attending the Meeting issued the Bali Declaration expressing their renewed commitments to and calling the attention of the CSD-9 on the region specific issues and priorities pertaining to sustainable energy development. The Meeting also adopted the Sustainable Development Action Programme, Strategies and Implementation Modalities for the Asia and the Pacific Region. As there is no regional or international agency that covers the entire region to deal with energy matter, ESCAP will continue to play a catalytic role in the promotion of regional cooperation in the field of energy in partnership with other sub-regional energy agencies, such as the ASEAN Energy Centre, Asia Pacific Energy Research Centre, South Asia Association for Regional Cooperation and the (Pacific) Forum secretariat.

In the area of energy resources the strategy is to strengthen national capacity in sustainable development and management of energy through appropriate policy and planning; energy conservation and efficiency; and enhanced use of new and renewable sources of energy. The main thrust of the activities has been on technical assistance activities provided to developing countries in the form of advisory services and group training activities (national and regional workshops, symposium, training courses) for capacity building. Activities focus on promoting sustainable energy development policies and strategies with a emphasis on capacity building in strategic planning and management of natural resources in an integrated way.

ESCAP also undertakes efforts to promote new and renewable sources of energy by disseminating information through case studies, workshops and seminars. Efforts in promoting energy efficiency and conservation are facilitated by rendering advisory services and energy managers training programmes as well specific activities to promote investment. The Secretariat's activities have often been successful in terms of generating bi-lateral follow-up cooperation such as pre-feasibility and feasibility assessment or even investment on efficiency improvement potentials in energy intensive industries, such as cement and steel industry carried out in a few countries by teams of experts comprising the ESCAP expert and Japanese specialists. Special attention is given to the participation of non-governmental organizations (NGOs) and places high priority on collaboration and cooperation with other UN and relevant regional organizations.

Over the next 3-5 years the focus will remain on the promotion of sustainable energy development through assisting developing members and associate members of ESCAP in building and/or strengthening their national capacities in adopting and implementing a rational policy towards a sustainable energy path. Programme areas will include a shift from high carbon to low or no carbon energy resources, such as natural gas, new and renewable sources of energy, and on energy efficiency and conservation. Since fossil fuel will remain the predominant source of energy in the region, there will also be a need to adopt clean fuel technologies as a part of the national energy policy. Appropriate funding mechanisms will also be explored.

4. Economic Commission for Latin America and the Caribbean (ECLAC)

ECLAC provides advisory services to member states on energy and sustainable development matters; in particular for a) strengthening the capacity of national institutions in energy policies; b) providing technical support to develop national capacity for energy project evaluation and economic regulations; c) preparing sector studies on energy panorama and perspectives for the specific country or the Region; and d) organizing regional and interregional seminars on energy development & planning. Specific areas of focus have been on restructuring of the energy industry in member states, the potentials and use of new and renewable sources of energy in the region, promoting the development of specific energy sources

such as geothermal, energy development and management, planning and regulation the design and application of energy plans and policies in the hydrocarbon & power sector.

C. United Nations Development Programme (UNDP)

1. UNDP's Approach to Sustainable energy

UNDP is firmly committed to support energy as an instrument for sustainable development. Strategies and interventions are needed that promote energy as an engine for equitable economic growth and poverty reduction. Energy use is highly unequal between North and South, rich and poor, men and women. In April 2001 at the Ninth Session of the Commission for Sustainable Development (CSD-9) the governments of the world concluded: *“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.”*¹ This challenge presents an opportunity: adopting ways and means of producing and using energy that are economically, socially and environmentally sustainable thereby making energy an important tool for sustainable development.

As a means to support the discussions leading up to CSD-9, UNDP, together with the UN Division for Economic and Social Affairs (UNDESA) and the World Energy Council (WEC), prepared the *“World Energy Assessment: Energy and the Challenge of Sustainability”*(2000). This was the major advocacy and analysis effort of UNDP in the recent period and builds on an earlier UNDP publication *“Energy After Rio: Prospects and Challenges”* (1996). Among the main conclusions of these reports were that without significant worldwide changes in energy production and consumption, social inequities will increase, environmental problems such as climate change and ecosystem degradation will accelerate, and global economic growth will be jeopardized. These outcomes are avoidable through decision making in the public sector and investment decisions favoring sustainable energy options in the private sector. All UNDP publications on energy are available at: <http://www.undp.org/seed/eap>

UNDP's efforts in sustainable energy support the Millennium Summit objective of reducing by half the number of people living in poverty by 2015. To do this concerted international efforts are needed to help reduce by half the proportion of people without access to modern energy. Indeed, none of the agreed upon Millennium Summit development goals can be achieved without major increase in energy services in the developing world. UNDP's experience in integrated development solutions gives it a unique perspective to address the multiple social, economic and environmental aspects of sustainable energy approaches. UNDP is able to work with multiple stakeholders from the public and private sectors, consumer groups, technical experts as well as civil society. This multi-dimensional development perspective, cross-sectoral working ability and inclusiveness in constituency building, are UNDP's greatest strengths and define its development niche.

2. AREAS OF FOCUS : LOOKING FORWARD

In 1996 UNDP defined its energy programme strategy in the UNDP Initiative for Sustainable Energy (UNISE). *Sustainable energy* refers to energy produced and used in ways that support human development over the long term in all its social economic and environmental dimensions². In line with global agreements on energy, UNISE advocates increased activities in the three priority areas – efficiency, renewables and new technologies.

On September 10, 2001, UNDP launched the **Thematic Trust Fund on Energy for Sustainable Development**— to mobilize resources to meet programme country demands and to clearly define energy programme and policy priorities organization wide. The Trust Fund modality is a new, more flexible and

¹ Ninth Session Statement, Commission for Sustainable Development (CSD-9) Decision 9/1, para 22.

² This concept is discussed at length in the *“World Energy Assessment: Energy and the Challenge of Sustainability”*, published in 2000 by UNDP, UNDESA and the World Energy Council.

agile co-financing modality specifically designed for a rapid approval of proposals and swift disbursement of funds at the country level. The UNDP Thematic Trust Fund (TTF) on Energy for Sustainable Development focuses on energy as a means of helping countries lift themselves out of poverty and onto a sustainable development path. There are four main components, or service lines, of the TTF on Energy for Sustainable Development:

- **Service Line 1:** Strengthening national policy frameworks to support energy for poverty reduction and sustainable development;
- **Service Line 2:** Promoting rural energy services to support growth and equity;
- **Service Line 3:** Promoting clean technologies for sustainable development; and
- **Service Line 4:** Increasing access to investment financing for sustainable energy (e.g., supporting efforts by developing countries to shape and participate in the Clean Development Mechanism).

A fifth cross-cutting area in the trust fund is global and regional support activities involving global advocacy and analysis. The full text of the TTF on Energy for Sustainable Development can be found at the website: <http://www.undp.org/trustfunds/>. This new TTF is the principle vehicle for additional non-core resource mobilisation to support country-level energy activities and is complementary to the GEF.

3. UNDP's sustainable energy activities: A Retrospective

In 2000, 66% of all UNDP country offices surveyed reported working on sustainable energy with the major areas of focus on energy efficiency, renewable energy and energy planning. Emphasis on climate change issues clearly emerged based on activities funded through the UNDP's Global Environment Facility (GEF) programme. UNDP regular resources on sustainable energy issues focused on rural energy, community development and links with the provision of social services.

UNDP programme activities in energy in the 1991-2000 period amounted to \$1.19 billion including the Global Environment Facility (GEF), compared to \$460 million during the 1965-1990 period. Energy activities in the three sustainable energy entry points (efficiency, renewables and next generation technologies) grew rapidly in the 1990's moving away from previous efforts in conventional energy (oil, gas and coal) in keeping with UNDP focus on sustainable human development and the growth of private sector energy sector financing in developing countries. Activities in 1991-2000 were supported by UNDP regular core resources (US\$ 61 million), GEF resources (US\$ 334 million), other third party cost sharing resources (US\$ 586 million). A particular fund under the Oil for Food programme that is dedicated to the rehabilitation of the electricity sector in Iraq supported energy activities totaling US\$ 316 million.

In terms of geographical distribution of energy activities in UNDP during 1991-2000, Africa consists of 7%, Asia and the Pacific 30%, Arab states 7%, East Europe and CIS 6%, Latin America and the Caribbean 20%, Global activities 5%, and the Oil for Food related activities 26%.

In this reporting period the UNDP-GEF programme has been the most instrumental source of programme development in the area of sustainable energy. The GEF focuses on generating global environmental benefits and funding approval is based on incremental costs at the project level to address greenhouse gas mitigation objectives. UNDP-GEF focuses its primary efforts on building capacity to enable developing country Governments and civil society to take actions required to respond to the challenges of global climate change. There are UNDP-GEF programmes in more than 100 countries. UNDP-GEF projects are currently strengthening more than 2,000 institutions worldwide to meet the challenges of global climate change. Particularly important has been the UNDP GEF Small Grants Programme (SGP) which provides grant assistance directly to community level organizations and NGO's to undertake environmental work, including projects related to energy for sustainable development. GEF's Operational Strategy sets out four long-term operational programmes in the energy and climate change focal area:

- **Operational Programme 5:** Removing barriers to energy conservation and energy efficiency;
- **Operational Programme 6:** Promoting renewable energy by removing barriers and reducing implementation costs;
- **Operational Programme 7:** Reducing the long-term costs of low greenhouse gas-emitting energy technologies; and
- **Operational Programme 11:** Promoting sustainable transport

While the UNDP-GEF programme will remain an essential means of financing to support sustainable energy options, numerous policy, capacity building, rural development and gender equity considerations related to energy, can only be supported through a non-GEF mechanism. The UNDP Thematic Trust Fund on Energy for Sustainable Development, described above, has been designed to be fully complementary with the GEF, building on UNDP's existing track record and is a means to help integrate GEF programmes.

Conclusion: UNDP-wide, six thematic priority areas have been established to focus programming efforts: one of these six is the practice area of Energy and Environment. UNDP programme resources have steadily increased for sustainable energy over the last decade. On average, the budget for sustainable energy and climate change programmes showed a 6-fold increase from the period 1965-1990, increasing from \$0.5 million per project to US\$3.2 million per project in the 1990's. The significant growth in resources helped implement a more cohesive and integrated approach. Looking forward to WSSD and beyond, UNDP will focus its efforts in energy for sustainable development on the linkages between energy and other priority issues including good governance and effective public institutions, poverty reduction and economic growth, the advancement of women and the preservation of the local and global environment.

D. United Nations Environment Programme (UNEP)

UNEP's goal is to insert a longer term, environmental dimension into energy sector decisions. Our activities help decision makers understand better the link between the energy choices they face and broader sustainable development issues, and to use this knowledge to make better decisions.

UNEP develops and helps governments apply approaches for analyzing various energy policies, climate change mitigation options, energy sector reform, and transport choices. A special effort is made to help financial institutions understand better the investment opportunities presented by renewable energy and energy efficiency projects, work that builds off UNEP's long history of cooperation with banks and insurance companies. Our efforts are primarily directed at developing countries, and much of our work is done jointly with energy-environment-development institutes worldwide. As a result of CSD-9, we are now strengthening this informal network of regional centers working on environment, energy, and development issues, with a goal of building a tighter global community of sustainable energy practitioners, a structure where creative solutions to energy-environment-development problems are more easily shared and knowledge exchanged.

The purpose of the Network is to bring about greater flow of knowledge on practical solutions to energy problems in the context of sustainable development. Not a coordinating mechanism, the Network will link existing centres in both developing and developed countries in a manner that allows them to put knowledge and experience to bear on important energy issues, primarily working through national institutions.

Bringing this Network into being is the main UNEP activity driven by CSD9 outcomes. Many other UNEP activities, however, contribute to the goal of linking more closely the provision of energy services with sustainable development objectives.

The **African Rural Energy Enterprise Development Initiative (AREED)** is enabling the private sector to deliver affordable energy services based on clean and renewable energy technologies in six

African countries. A similar initiative has started in Northeast Brazil and a China 'REED' will start in 2002 in Yunnan. All three REED projects help address the problem of accessibility to energy in rural areas.

With the World Bank, UNEP is investigating ways **to overcome financial sector barriers to lending for energy efficiency projects** in Brazil, China, and India. Improving the financing of energy efficiency investments in industrial settings is also the goal of a GEF-funded effort helping National Cleaner Production Centers integrate energy efficiency in their mainstream CP programmes, and the Energy Management and Performance Related Energy Savings Scheme (EMPRESS) project. EMPRESS will soon help establish specialized energy service companies (ESCOs) that provide services to industrial and commercial clients in CEE countries.

UNEP also has underway efforts aimed at helping governments in Sub-Saharan Africa **with power sector reform, energy sector finance, energy subsidy reform, and climate change policy**. Together with the IEA, UNEP continues to promote approaches to **energy subsidy reform** that incorporate social and environmental considerations. A summary report of a series of regional meetings that included policy recommendations was an input to CSD9, and a popular publication on energy subsidies is being prepared for WSSD.

By working with various types of **financial institutions, insurance companies and Export Credit Agencies**, UNEP is exploring ways to direct finance and investment flows to sustainable energy projects, particularly in developing countries. A recent workshop on environmental issues for Export Credit Agencies highlighted possibilities of ECA support in the financing of renewable energy technologies.

The Renewable Energy Technology/Energy Efficiency Investment Advisory Facility (IAF) continues to help financial institutions evaluate potential renewable energy or energy efficiency investments in developing countries and countries with economies in transition, as is being brought into the framework of the UNEP-GEF SANet project. UNEP is working with rural Indian finance institutions to develop a credit facility for solar system purchases that uses United Nations Foundation resources to buy down the initial risks of lending to this sector.

In the transport area, UNEP manages a Mobility Forum for discussion and joint activities involving representatives of major automotive manufacturers. A report on past activities and remaining challenges in the field of the auto industry and the environment is being prepared by the group as an input to WSSD, and indicators for sustainability reporting specific to the automotive sector are being prepared in a stakeholder dialogue process as a contribution to the Global Reporting Initiative. Mobility Forum members are preparing sector-specific indices for reporting on sustainability, and a campaign on environmentally friendly driving behavior is planned. As a starting point for its work in the area of aviation and environment, UNEP is planning a conference on airports and the environment, which will be held in early 2002.

III. United Nations Agencies

A. United Nations Educational, Scientific and Cultural Organization (UNESCO)

UNESCO plays an advocacy role in furthering renewable energy technologies as a tool for sustainable development in rural regions, particularly in developing countries. Advisory services are provided to Member States to develop capacity-building in sound energy policies. UNESCO's activities lay emphasis on the educational and training components of the World Solar Programme 1996-2005 (WSP) as well as on fostering communication and information services and networks. Engineers, technicians and energy planners are trained in the installation, maintenance and promotion of solar energy systems. Brochures, textbooks, learning and teaching packages on renewable energy sources are prepared,

disseminated and field-tested. At its fifty-fifth session the United Nations General Assembly adopted a resolution in support of WSP acknowledging UNESCO's renewable energy education programmes.

In order to foster work in this field based on CSD-9, UNESCO will deploy efforts towards the development of competent human resources geared to promoting sustainable and renewable energies, energy diversification and efficiency, in order to improve living conditions in rural and remote areas, especially in developing countries, particularly for women. In follow-up of the ninth session of the Commission on Sustainable Development, UNESCO will give priority to education, training and information programmes to facilitate large-scale use of renewable energy sources and technologies. Activities will aim at implementing the Global Renewable Energy Education and Training (GREET) Programme with particular emphasis on its African chapter. This will involve the design and implementation of training solar platforms, the elaboration, dissemination and testing of interdisciplinary learning materials and textbooks on renewable energies and the introduction of renewable energy education and training programmes at all education levels. Concurrently, efforts will be made to further the International Renewable Energy Information and Communication System (IREICS), including online and hard copy publications. ICTs will be used to offer databases and best practices on renewable energies and networking will be encouraged. Support will be given for the formulation of national renewable energy strategies, research and pilot projects aimed at selected developmental purposes (e.g. rural electrification, water supply).

The following targets will be pursued by UNESCO:

- Production and dissemination of updated educational materials and packages on renewable energy development and management.
- Increased number of specialists and managers and enhanced institutional capacities in renewable energies, especially in Africa.
- Development of online information on renewable energy including energy resource mapping, virtual libraries and data.
- Enhanced capacity in Member States, particularly least advanced and developing countries, to formulate national strategies for the use of renewable energies, such as for purposes of decentralized rural electrification, micro-hydro and water supply.
- Pilot projects conducted, focusing on solar facilities and solar villages.
- Enhanced knowledge about the use, maintenance and management of solar energy systems.

B. United Nations Industrial Development Organization (UNIDO)

The deployment of sustainable energy technologies and services in developing countries constitutes a major global challenge also due to its financial dimension. Although official development assistance to developing countries will continue to be important, those financing needs in developing countries and countries with economies in transition are increasingly shifting from multilateral financial institutions to domestic and international private financial firms and energy companies. This shift is primarily attributable to the global trend of energy sector privatizations and market openings. Governments are expected to play an increasing role in setting policy and developing laws and regulations for the sector, while the private sector is expected to increase financing, and build and manage the energy infrastructure. The international community, in turn, shall play a vital role in assisting developing countries in the reform process by providing demonstration projects, policy advice, capacity building support and technology transfer promotion. Particularly, the need is clear to provide economic predictability to energy investment in the developing world, mainly through deregulation and effective legal and regulatory frameworks.

Access to energy is crucial to economic and social development, and alleviation of poverty, as well as to finding an appropriate response to environmental concerns. Improving accessibility of energy implies finding ways and means by which energy can be delivered reliably, affordably and in an environmentally sound and socially acceptable manner. Our experience at UNIDO is that the more cost-productive and sustainable way to achieve it is by creating an enabling environment for the private sector or energy cooperatives to engage in the generation and distribution of electricity on a commercial basis, including decentralized electrification solutions based on renewables (solar, wind, biomass, biogas, bio-fuels, small hydro, etc). Adequate energy policy and regulatory framework are certainly pre-requisites to it.

UNIDO's experience indicates that developing countries require not only macro-economic changes, but also targeted social policy actions in order to make commercial energy more widely available in rural areas. Satisfying the energy needs of rural areas with modern fuels and technologies not only has the potential to create new industries, jobs and business opportunities, but also to improve standards of living and health. Centralized energy for isolated areas tends to be not only lesser sustainable, but also economically inferior, due to its own philosophy of incremental extension, conducive to unplanned development, power quality problems and poor capacity utilization and efficiency.

UNIDO's underlying principles of energy for sustainable development are embodied in an approach that seeks to promote the efficient production and use of energy, wider-scale use of renewable energy sources, and transition to the next generation of advanced energy technologies. Given the interdependencies and complexities inherent in dealing with energy issues, a broad range of different specific strategies are needed at the national, regional and international levels to address energy for sustainable development.

UNIDO's technical cooperation programme focuses on two major issues: Improving the energy services in developing countries, and Improving the energy efficiency (or lowering the energy intensity) of the industries of developing countries.

UNIDO's Energy Programme is based on the following competitive advantages of the Organization: a) accumulated sectoral experience in energy intensive sectors in particular cement, brick making, metallurgy, chemical, pulp and paper, glass, as well as in the manufacture of energy equipment; b) experience in the promotion of international cooperation in energy technology; c) vertical integration under the same roof of all services required in a typical project cycle: identification, formulation, implementation and monitoring; and d) sound track record of energy projects in developing countries and in countries with economies in transition. Particular experience in the LDCs is worth mentioning.

UNIDO's approach to energy issues within the multilateral system and in all regions is to support capacity building of both technical and governance institutions. In this respect, UNIDO facilitates the development and implementation of projects addressing climate-friendly, energy-efficient industrial technologies through assisting developing and transition-economy countries to identify and remove barriers to the introduction and transfer of such technologies.

In order to achieve this, UNIDO provides the following services:

- Expert advice, including knowledge-based assistance
- Training
- Dissemination of information
- Technology transfer, including through networking and partnership
- Procurement and contracting
- Energy audits
- Demonstration projects

Parallel to Technical Cooperation projects, UNIDO's Energy Programme also addresses the relevant issues of the energy field through global forum activities whereas specific broad issues are/can be addressed such as impact of globalization on energy sustainability, GHG reduction strategies.

C. United Nations Framework Convention on Climate Change (UNFCCC)

An overwhelming majority of scientific experts believe that the rise in emissions of greenhouse gases (GHGs) such as carbon dioxide, methane, nitrous oxide, and the chlorofluorocarbons, resulting from important human activities, are changing the composition of the atmosphere which will cause the earth's climate to change. In the absence of policies aimed at reducing such GHG emissions, global mean surface temperatures are projected to increase by about 1.5 to 6°C by 2100. As climate warms, evaporation will be enhanced thus increasing precipitation as well as the frequency of intense rainfall.

A number of intergovernmental conferences focusing on climate change were held in the 1980s and early 1990s. In 1979, the First World Climate Conference recognized climate change is indeed a serious problem. The scientific gathering called on the world's governments "to foresee and prevent potential man-made changes in climate that might be adverse to the well-being of humanity." The UN Framework Convention on Climate Change (UNFCCC), adopted in 1992 during the UN Conference on Environment and Development at Rio de Janeiro, sets an "ultimate objective" of stabilizing atmospheric concentrations of GHGs at safe levels. Such levels should be achieved 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.

To achieve this objective, Parties to the Convention have a general commitment to publish national inventories of GHG emissions, to develop national programmes containing measures to mitigate climate change by addressing anthropogenic emissions by sources and removals of sinks, and to cooperate in the development and transfer of technologies in the sectors of energy, transport, industry, agriculture, forestry, and waste management

The Convention aims at ensuring that the sacrifices to be made for protecting the climate system will be shared fairly among Parties in accordance with their "common but differentiated responsibilities and respective capabilities and their social and economic conditions." It recognizes two groups of countries: Annex I Parties are those (developed countries and most of those with economies in transition) that have the largest share of historical and current emissions. Non-Annex I Parties are basically countries from the developing world. Annex I Parties have committed to adopting national policies and measures with the non-legally binding aim of returning their greenhouse gas emissions to 1990 levels by the year 2000. They must also submit regular reports, known as national communications, detailing their climate change policies and programmes, as well as annual inventories of their greenhouse gas emissions. Other activities and issues under the Convention such as in-depth reviews of national communications, provision of financial assistance, facilitation of technology transfer and development of relevant methodologies, are also of critical importance to forging an effective response to climate change.

At the first Conference of the Parties in 1995, Parties decided that in order to achieve the objective of the Convention the specific commitments for Annex I Parties needed to be strengthened. A new round of talks was therefore launched to decide on stronger and binding commitments for these countries. In 1997, the Kyoto Protocol to the Convention was adopted by consensus. It commits Annex I Parties to individual, legally-binding targets to limit or reduce their GHG emissions, adding up to a total cut of at least 5% from 1990 levels in the period 2008-2012.

The Protocol also establishes three innovative "mechanisms," known as joint implementation, emissions trading and the clean development mechanism, which are designed to help Annex I Parties reduce the costs of meeting their emissions targets by achieving or acquiring reductions in other countries than at home. The clean development mechanism also aims to assist developing countries in achieving sustainable development by promoting environmentally-friendly investment in their economies from industrialized country governments and business.

The above mechanisms were agreed to in principle in the Protocol. However, their operational details must still be fleshed out and this is a key task for the COP6. Parties must also develop the compliance system outlined in the Protocol, and further work is also needed in provisions for land-use change and forestry sector, methodologies for estimating emissions and removals, and reporting

obligations. How to address the vulnerability of developing countries is another issue being addressed. Some developing countries in low-lying areas, are highly vulnerable to the impacts of climate change. Others feel more threatened by potential economic repercussions of mitigation action.

In order to enter into force, the Protocol must now be ratified by 55 Parties to the Convention, including Annex I Parties accounting for 55 per cent of carbon dioxide emissions from this group. Although some countries have already ratified or acceded to the Protocol, no Annex I Party has yet done so. The resumption of the COP6 is planned for the first half of 2001.

The Climate Change Secretariat supports the Parties in furthering the negotiations concerning the implementation of the Convention and toward the ratification of the Protocol. It prepares technical and policy papers related to a range of issues many of which have energy implications; summarizes and synthesizes information on GHG mitigation measures and policies in the energy sector provided in the national communications of the Parties; facilitates the development of a framework for technology transfer, which includes defining priorities in the area of renewable energy and energy efficiency; as well as the development of the capacity building framework, which includes defining priorities for capacity building in developing countries in the area of reducing GHG emissions including those of the energy sector. The UNFCCC Secretariat cooperates with other UN bodies and with other conventions on a range of issues ensuring that these bodies can use optimally their expertise and capacities to assist in the further development and implementation of the Convention.

D. World Health Organization (WHO)

Energy, being key to economic development and its impact on poverty alleviation, has great importance and relevance to WHO as the lead agency on health. Energy considerations, broadly defined, form an important component of many differing activities and programmes of WHO. Several key policy and strategy documents have guided, and continue to guide, the work of the World Health Organisation in regard to energy-related activities. These include the renewed Health-for-All policy (HFA in the 21st Century), Agenda 21 (Chapter 6, for which WHO is task manager), and other policies and strategies relevant to the newly restructured WHO, especially its cluster on Sustainable Development and Healthy Environments. These establish a range of differing objectives which are directly or indirectly related to energy activities. WHO's work is conducted in collaboration with other agencies in the UN system, regional and international organisations, collaborating centres, research and academic institutions, NGOs and others.

The following are examples of activities that have constituted part of WHO's programmes related to energy development and use, some indirectly through broad planning initiatives concerned with health in sustainable development and poverty reduction:

- * Assessing impacts on health of development policies and projects, including energy-related aspects, promoting and supporting research and capacity-building in health impact assessment, for example in relation to dams/reservoirs for hydropower generation;
- * Contributing to health risk assessment of different energy sources, technologies and systems;
- * Monitoring and assessing linkages between development, health and environment impacts, incorporating an energy dimension; this includes also the development of indicators and methodologies;
- * Promoting and conducting assessments of health impacts and intervention strategies related to various forms of household energy (emphasis on biomass burning), as well as capacity-building, awareness-raising and policy development (A strategic initiative on household energy, fuel poverty and the indoor environment has been promoted at WHO - case studies on policies and strategies to address the problem have been initiated);
- * Strengthening capacity at national and sub-national levels in policy and planning for health in relation to sustainable development and poverty reduction, through mechanisms such as A21, HFA, Healthy Cities, PRSPs, national planning and related initiatives. This involves many sectors, including energy;
- * Conducting activities in the area of radiation protection, including health risk assessment, follow-up on the health effects of Chernobyl, developing preparedness and response mechanisms in radiological emergencies through a radiation emergency medical preparedness and assistance network of collaborating centers;

- * Conducting activities in the area of EMF, including health risk assessment, identification of research needs, development of criteria and standards, studies of risk perception and communication, and support and advice to national authorities;
- * Assessing air quality and health implications in urban areas, relating to emissions from motor vehicles, industries and energy sources; providing monitoring data and information;
- * Promoting the assessment of health benefits (near- and long-term) in relation to various energy-related sectors which derive from changes in energy efficiency and energy use;
- * Supporting climate-related activities in terms of international frameworks and conventions, and initiatives such as IPCC and the Climate Agenda process, incorporating a health and development perspective;
- * Supporting programmes to protect the health of workers and communities by promoting clean energy and clean technologies in various sectors, including the informal sector;
- * Promoting the use of alternative technologies in the rural health sector, focussing on the provision of vaccine refrigerators for the EPI cold chain; and
- * Assessing health impacts on end-users of services provided by energy, such as of cooking, heating, lighting, provision of water and sanitation.

E. World Meteorological Organization (WMO)

The WMO provides the authoritative intergovernmental voice in scientific matters relating to atmosphere, water and climate as outlined in the WMO Long Term Plan. The WMO programmes address relevant chapters in the Agenda 21 and act in the implementation of the decisions taken by the Conference of the Parties to the Framework Convention on Climate Change. In 1988 the WMO established with UNEP the Intergovernmental Panel on Climate Change and continues to provide significant support. Coordination and linkages with other international energy related organizations and programmes are assured through the process under the Climate Agenda.

WMO promotes sustainable energy production and use in several programmes. WMO's energy-related activities include:

(i) provision of guidance material and implementation of several training seminars, focusing on use of climate information in development of new and renewable sources of energy such as biomass, hydropower, solar and wind energy.

(ii) support to development of energy-related assessments within the framework of the UNEP/WMO Intergovernmental Panel on Climate Change.

(iii) contribution to the development of methods for comparative assessment of environmental impacts of different energy sources within the framework of the inter-agency DECADES project.

Different forms of energy production, including hydropower, biomass energy, solar and wind energy, draw on resources which are significantly dependent on climate conditions. One thrust in WMO programmes is the provision of guidance material and capacity building in the needs and requirements for services to the energy sector.

WMO provides guidance material and support to training in energy conservation, especially in urban and building development within the framework of a Tropical Urban Climate Experiment (TRUCE).

F. United Nations Fund for Population Activities (UNFPA)

UNFPA promotes a greater understanding of the interrelationships between population and environment, including energy, in all its programmes, in accordance with the interface goals and objectives of UNCED and ICPD. UNFPA promotes fair and equitable access to the use and management of resources, within an enabling environment. The eradication of poverty will not be possible without the recognition of a shared culture of access to every individual of basic energy resource and basic social

services, including health and reproductive health and rights; gender equality, equity and the empowerment of women.

The International Conference on Population and Development (ICPD), in affirming these relationships, noted that sustainable development implies, *inter alia*, long-term sustainability in production and consumption relating to all economic activities, including industry, energy, agriculture, forestry, fisheries, transport, tourism and infrastructure, in order to optimize ecologically-sound resource use and minimize waste. It called for the integration of population issues into economic and development strategies to speed up the pace of development and alleviate poverty. As lead agency in the follow-up of ICPD and as task manager for population to the goals of UNCED, UNFPA seeks to assist countries in their goals of sustainable development and poverty eradication, population and environment.

UNFPA promotes coordinated and holistic approaches to energy assessments and impact, energy development, energy supply and use that take into account the many and changing population needs – its composition, distribution, scope and basic needs for all. UNFPA seeks to use new opportunities, in particular, through the UN reform initiatives such as the Common Country Assessment and United Nations Development Assistance Framework and other appropriate comprehensive development frameworks, at all levels of policy and planning. UNFPA promotes integrated planning to enhance the capacity of countries to address their own goals through strengthened policy planning and analysis using improved data and methods to track the complex and dynamic relationships between population and energy.

G. Food and Agriculture Organization (FAO)

FAO's views on energy focus on the necessary transition towards more sustainable energy systems, particularly in relation to the rural energy situation in developing countries. FAO views this transition as a move from the present energy supply and inefficient use of mainly fuelwood and other biomass fuels and of animal and human power, to a more diversified resource base, increasingly utilizing renewable energies and a more modern use of biomass. This transition is key to attaining sustainable livelihoods, food security and improving the living conditions of rural populations. The role of renewable energy sources and, in particular, of bioenergy in both developmental and environmental terms is an important element in FAO's vision of energy matters. Carbon sequestration and substitution by bioenergy is also of increasing interest in the context of the Climate Change Convention.

Most developing countries need to strengthen their institutional and human capacities to implement rural energy programmes. Useful in these efforts are the Nairobi Programme of Action on New and Renewable Sources of Energy and Agenda 21 adopted at UNCED. FAO's view and ultimate objective is that the energy transition leads to enhanced rural and agricultural productivity. International environmental conventions, the World Food Summit and the Commission on Sustainable Development (CSD) process and the recently established Global Forum for Sustainable Energy open opportunities to fulfil that objective.

FAO's energy activities emphasize the need to develop and promote technologies and strategies for the use of renewable energy sources adapted to the socio-economic needs of rural populations. FAO's technical assistance activities recognize that agriculture, forestry and fisheries have a double role and potential, as both consumers and producers of energy in the form of renewable bioenergy. These activities take an integrated approach to the assessment, planning and implementation of energy and sustainable rural development. All steps in the food chain require energy and a systematic approach is taken to its "energization". Renewable energy applications are promoted, especially in relation to enhanced agricultural productivity and other income-generating activities. Networking is also promoted and realized through initiatives such as the Latin American and Caribbean Working Group on Rural Energization for Sustainable Development, the Regional Wood Energy Development Programme in Asia and the Sustainable Rural Environment and Energy Network for the European Region. The interrelationships between agriculture and energy have been assessed in the context of the preparations for CSD 9: a document entitled: The Energy and Agriculture Nexus has been recently published.

Special emphasis is placed on bioenergy, which plays a key role in the present energy scenario in rural areas and has a high potential as a modern energy carrier. Wood energy data and projections are an

important component of FAO's energy activities. FAO has gathered information on the dynamics of bioenergy flows and has been providing multidisciplinary approaches and technical expertise in this field. FAO has gathered experience in the development of methodologies and definitions, management and analysis of databases, policy advice and development of national and regional specialized bioenergy studies. Attention is given to the energy function of the sugar industry, as one of the diversification strategies of that sector, and to the production of low-cost transport fuels. FAO also promotes awareness and better use of work animal technology. The Organization has also implemented field projects aimed at:

- increasing the supply of biofuel (through multipurpose tree plantations and sorghum species, agroforestry schemes, community forestry, utilization of agricultural residues);
- reducing woodfuel consumption and increasing energy efficiency;
- promoting renewable energy applications (to enhance agricultural productivity and for rural services such as electricity);
- improving market and trade mechanisms;
- fostering gender equality;
- addressing health problems;
- promoting bioenergy for combined heat and power.

A significant number of projects have been implemented in areas such as wood energy, bioenergy, biogas, solar drying, illumination and water lifting. Agricultural engineering solutions to promote fuel-saving cropping systems (conservation tillage, zero tillage), human and work animal energy, efficient energy and water use in irrigation, and energy-efficient fishing vessels are other focus areas. In the crop-specific area, technology transfer of new drought- and saline-tolerant sweet sorghums for alcohol production is being pursued. The particular characteristics of links between energy and environment in rural areas are being assessed. Animal and agro- and agro-industrial residues, their valorization and the protection of local environmental quality are also topics given particular attention and network support.

Outstanding challenges to achieve the necessary energy transition are the development and implementation of rural energy policies and programmes with concerted action of all interested parties: farmers, local and national governments, the private, financial and academic sectors and international institutions. The physical and economic accessibility to sustainable energy forms by the poorest rural and peri-urban populations for income-generating and subsistence activities remains an urgent and critical matter.

H. International Atomic Energy Agency (IAEA)

Summary

The IAEA's energy activities focus primarily on assisting developing country Member States to do the capacity building, training, analysis and planning that are an essential part of bringing energy to those who lack access, and improving the quality of energy services for everyone. As such, the IAEA's energy activities address directly the key role for energy in sustainable development identified by CSD-9. In addition, the IAEA leads a multi-agency initiative to develop "Indicators for Sustainable Energy Development" (ISED).

The planning and analysis tools and data provided by the IAEA, its training and capacity building activities, and its cooperative analysis projects with participants from developing country Member States cover *all energy supply and demand options, all energy systems approaches and all environmental concerns* that are relevant for the participating countries. These activities are *not* restricted to nuclear energy.

CSD-9's decision on energy also states that some countries consider "nuclear power... a sustainable energy source with both economical and environmental advantages", and some do not. For those that do, the IAEA's Nuclear Energy Department further contributes to sustainable development through activities to improve nuclear technologies and applications. These activities include developing,

assembling and disseminating information, experience, data, analytic tools and standards, all to improve the cost-effectiveness, performance and safety of nuclear energy.

Capacity Building, Training, Analytic Tools and Cooperative Analysis

Under this heading the IAEA's energy activities focus on (a) improving indigenous planning and analysis capabilities in developing countries, (b) transferring modern planning methods, tools and databanks, (c) training developing country staff in model set-up and application and (d) interpreting and synthesizing model outputs and applying them to policy formulation. The IAEA's main objective is capacity building in the area of energy-environment planning and analysis in developing countries. These are an essential part of the capabilities a country needs to meet the energy needs of its people. Given energy's central role in sustainable development as defined by CSD-9, and the central importance of bringing energy access to the poor, capacity building in these areas contributes importantly to sustainable development.

The IAEA's analytic tools are developed (or adapted from models in industrialized countries) to match the data availability conditions typical in developing countries. There are six main models as follows.

MAED, Model for Assessment of Energy Demand: MAED evaluates future energy needs based on medium- to long-term scenarios of socioeconomic, technological and demographic development in a country or region. MAED models how energy demands are influenced, or driven, by a variety of social, economic and technological factors. Energy demand is disaggregated into a large number of end-use categories, each one corresponding to a given service or to production of a certain good. The influence of each of the social, economic and technological driving factors from a given scenario is estimated. These are combined for an overall picture of future energy demand growth.

WASP, Wien Automatic System Planning Package: The WASP model identifies the optimal long-term expansion plan for a power generating system within constraints defined by the user. In use in more than 100 developing countries, WASP is currently the most widely used model in developing countries for power system planning. The optimal expansion plan is calculated to minimize discounted total costs. The user may introduce various constraints, such as limited fuel availability, emission restrictions, system reliability requirements, etc.

ENPEP, Energy and Power Evaluation Package: ENPEP provides a comprehensive evaluation of energy system development strategies. It is now used in approximately 60 developing countries. It includes modules to assess energy demand, to balance overall energy demand and supply under market conditions by computing market clearing prices, to optimize expansion of the electric sector and to estimate environmental burdens from the energy system.

FINPLAN, financial analysis of power projects and plans: A number of constraints often make it difficult to implement the optimum expansion plan calculated for a country's electric sector. In developing countries, financial constraints are often the most important. FINPLAN helps assess the financial viability of plans and projects, taking into account different financing sources including export credits, commercial loans, bonds, equity and modern instruments like swaps. FINPLAN calculates projected cash flows, balance sheet, financial ratios and other financial indicators. It is currently used in more than 20 developing countries.

MESSAGE, Model of Energy Supply Systems and their General Environmental impacts: MESSAGE allows a user to formulate and evaluate alternative energy supply strategies for a country or region. The model finds the optimal energy supply strategy for user defined constraints on, for example, new investment limits, market penetration rates for new technologies, fuel availability and trade, environmental emissions, etc. MESSAGE is extremely flexible and can also be used to analyze energy/electricity markets and climate change issues.

SIMPACTS, Simplified Approach for Assessing External Costs and Environmental Impacts: SimPacts is a user-friendly, simplified approach for estimating the environmental impacts and external costs of different electricity generation chains. Designed for use in developing countries (a reduced form of the more complex methods used in industrialized countries), it requires only a bare minimum of data for such estimations, which are nonetheless comparable to those obtained from more sophisticated and data hungry models. The SimPacts package covers health, agricultural, forest and materials damage; airborne and water pollution as well as solid waste; and different generating technologies.

All these models incorporate data sets with up-to-date data on the technological, economic and environmental performance of current and future energy conversion technologies, on energy resources, on energy market price expectations and on general global energy perspectives. When the models are transferred to developing countries, the associated data sets are part of the package, and training in the use of the models that is provided to developing country representatives necessarily includes training in the use of the data sets.

The IAEA's Co-Coordinated Research Programmes (CRPs) provide another mechanism for methodology transfer and training. Here research teams from different developing countries work together within a specific targeted research programme to, for example, analyze energy-environment policy issues, assess externalities, identify cost-optimal greenhouse gas mitigation strategies or address any other energy-environment problem relevant to their respective home countries using the same set of methodological tools.

Finally, the IAEA conducts regional and national workshops to provide further assistance to developing countries. These workshops address country or region-specific issues within the fields of energy-environment modeling, planning and policy analysis. On average, the Agency conducts three workshops per year in developing countries.

Indicators for Sustainable Energy Development (ISED)

The IAEA leads a multi-agency project on Indicators for Sustainable Energy Development (ISED). Other agencies in ISED include the European Commission, the OECD International Energy Agency, the OECD Nuclear Energy Agency, the UN Department of Economic and Social Affairs (DESA), the UN Economic, Social and Cultural Organization (UNESCO), the UN Economic Commission for Europe (UNECE) and the UN Environment Programme (UNEP). As a first step, representatives from these agencies and eight countries, reviewed existing indicator sets and statistics in the energy field and together developed a set of 41 indicators. Twenty-three of the 41 are considered "core indicators", meaning they are relatively specific to energy and, within that subset, still essential for conveying a concise but complete picture of energy developments. The indicators were then field tested (successfully) in fifteen countries to assess data quality and availability. The next step is to apply the indicators at the national level in a systematic manner, thereby contributing to the development and implementation of sustainable energy development policies and programmes at the national level.

Co-operation to improve cost-effectiveness, performance and safety of nuclear energy for those countries choosing nuclear energy

The IAEA facilitates the exchange of non-commercial information on improved advanced nuclear power plant designs, advances cooperative research in the field of nuclear power development, provides support to developing countries in planning and implementing nuclear power programmes, promotes nuclear power engineering and technology know-how and transfer, provides for the training and development of personnel for nuclear facilities, works towards the preservation of knowledge and competence in the areas of nuclear power engineering and technology, and provides technical cooperation and support on nuclear fuel cycle, transport and waste technology (covering raw materials for reactor fuels, spent fuel and radioactive waste). This includes assistance in building up and strengthening national nuclear regulatory agencies, national nuclear research organizations and infrastructures for radioactive waste management. It includes assistance for the increasing number of developing countries with research reactors (there are 79 operating research reactors in developing countries) and for non-power applications in medicine (diagnostic and therapeutic), nutrition, agriculture, landmine detection, food safety, water

resources (radioisotope hydrology and desalination) and industrial applications. The Agency also provides training and guidance on the technical and administrative preparations required for shipping research reactor fuel back to the developed countries that provide it.

III. Other Organizations

A. Global Environment Facility (GEF)

The Global Environment Facility (GEF) leads the world in promoting energy efficiency and renewable energy for developing countries, and it is the financial mechanism of the U. N. Framework Convention on Climate Change. Through end 2000, GEF approved grants of \$1.09 billion and mobilized \$6 billion more for 132 projects and 140 enabling activities addressing climate change in more than 130 countries. Co-financing comes from governments, non-governmental organizations, other international institutions, and the private sector.

GEF support of strategic exercises known as “enabling activities”, capacity building measures linked to projects, and targeted training strengthens national capacities to assess and address climate change risks and clean power generation opportunities.

GEF energy projects foster markets and policies for a diverse set of technologies addressing the wide range of needs and circumstances – from efficient light bulbs and household-size solar systems to large-scale wind farms, solar thermal power plants, and efficiency improvements in steel and other industries. Nearly \$570 million in GEF funds and \$2.5 billion in co-financing have gone to 48 renewable energy projects in 47 nations. GEF funded projects include:

- 600,000 solar home systems for rural energy, practically doubling the installed base in developing countries.
- Roughly 300 megawatts (MW) of wind power, 430 MW of hybrid solar thermal/gas turbine power plants, 440 MW of geothermal power, 85 MW of small-scale hydroelectric power, and electricity from biomass, like sugar cane residue, in several countries.
- More than 3 million efficient compact fluorescent lights installed in homes in three countries.
- Biogas captured from agricultural, industrial, and municipal wastes providing power and lighting in eight countries.

Municipal programs for sustainable transportation, employing such innovations as fuel cell buses.

Key aspects of GEF projects include:

Equipment installations and demonstration. Many GEF projects install and demonstrate equipment, such as solar home systems, compact fluorescent lamps, and energy-efficient motors. The directly installed capacity and energy savings from these projects can be significant. However, these installations are fundamentally intended as demonstrations and must be replicated in order to achieve large-scale, indirect impacts.

Capacity building. This central feature of most GEF projects assists beneficiaries in understanding, absorbing, and diffusing technologies. Projects develop the skilled personnel and institutional capacities that are widely recognized as important for technology diffusion. Projects strengthen the capacities of public agencies, private sector firms, financiers, consumers, community organizations, and non-governmental organizations. For example, many projects assist public agencies to regulate, promote, finance, and sustain technologies. Projects may also provide technical and commercial information and training/advisory services to private sector firms.

New institutions and financing services. Projects are demonstrating a variety of new institutions and financing services for promoting technology diffusion. For example, financing is provided to local community organizations, private sector financiers and financial intermediaries, local entrepreneurs, public or private revolving funds, private debt/equity funds, and private-sector renewable energy project developers. Projects pilot industrial sector energy service companies known as ESCOs, rural energy service concessions, and utility-based programs that address energy demand. They also provide combinations of different types of financing for private sector activities, such as grants, concessional (no- or low-interest) loans, and contingent loans (forgivable under specified conditions).

Market transformation. Projects assist manufacturing firms to develop and market energy-efficient products as part of so-called “market transformation” approaches in which supply and demand sides are stimulated simultaneously. These approaches can include technical and financial assistance to producers, new equipment standards and certification, consumer information and education, regulatory changes, and other incentives.

Engaging the private sector in projects. The private sector participates directly in GEF projects as manufacturers and dealers, local project developers, financial intermediaries, recipients of technical assistance, technology suppliers and contractors, and project executors. In addition, several GEF projects are designed to directly mobilize private-sector financing. The International Finance Corporation is executing five projects (update?) in which managed investment funds are designed to leverage \$375 million in financing from the private sector with \$95 million in GEF grants. Other projects competitively solicit financial contributions from manufacturers to reduce retail equipment prices.

Roles of non-governmental organizations (NGOs). GEF projects involve international and national NGOs, community-based organizations, industry associations, consumer groups, and educational institutions. These organizations may help design and prepare projects, execute projects, advise implementation committees, train project beneficiaries, supply services and equipment, conduct social research, or provide technical or policy support.

Although most approved projects are still being implemented, project experiences, impacts, and lessons are emerging. Impacts are particularly visible from projects involving solar home systems, grid-connected wind and biomass power, energy-efficient lighting, and fuel switching and production/recovery. Completed or continuing projects have fostered new national policy and regulatory frameworks, international technology transfer through the private sector, growth of domestic industries for energy efficiency and renewable energy technologies and services, increased sales and investments, and provision of environmentally sound energy services to end-users. In addition to these development benefits, projects have directly and indirectly reduced greenhouse gas emissions.

Replication of direct impacts to produce indirect impacts is integral to GEF climate change strategies. Replication may occur, for example, from local to national markets, from one private-sector firm to others, from one local government to another, and from one country to another. Although there are a variety of mechanisms to promote replication that can be incorporated into projects, replication ultimately depends on actions of governments, consumers, NGOs, and/or the private sector after a project is completed. Achieving and demonstrating programmatic benefits from the GEF project portfolio will depend on continued dialogue and understanding of project designs and impacts by all stakeholders.

B. World Bank

The vision of the World Bank is a world free of poverty. Its actions in the energy sector – whether through loans, investment, financial guarantees, advisory activities or sector study - support this vision. Its energy sector program has three central themes that form the basis of its actions –(a) access – extending energy services to the poor (b) sector reform: the development of efficient energy markets (c) environment development of clean energy systems that are environmentally sustainable. The World Bank is also an implementing agency of the Global Environmental Facility (GEF) and the Multilateral Fund for the Montreal Protocol (MFMP).

The World Bank provides loans and technical assistance to developing countries in all aspects of the energy sector, including power supply and power sector restructuring, gas system development, rural electrification, hydropower development and regional electric interconnection. It also prepares studies on related technical and policy issues, including energy efficiency and energy conservation measures. It supports economic development of alternative energy sources such as mini-hydro, wind and solar energy, as well as geothermal and biomass.

New Delhi Communiqué on Energy for Sustainable Development New Delhi, 23 January 2002

A Multi-Stakeholders Round Table on Energy for Sustainable Development was held in New Delhi from 21 to 23 January 2002. It was attended by representatives of governments, the private sector, civil society groups, international and United Nations organizations, and agencies from around the world. During the deliberations, a number of observations were made and several suggestions and options were proposed as concrete actions and partnerships to promote energy for sustainable development. These options and strategies are also intended to contribute to the realization of the United Nations Millennium Declaration that calls for halving by 2015 the proportion of people whose income is less than one dollar a day; these are summarized below.

The participants strongly emphasized the crucial role of energy in achieving the goals and objectives of sustainable development. The main challenge lies in providing access to energy services to the 2 billion people who currently do not have such access. The participants recognized that any effort at global, regional and national levels towards using energy for sustainable development has to focus on two aspects – long term human well-being and ecological balance.

The participants recognized that different countries faced different challenges with regard to energy and may therefore require different options and strategies to suit local needs. Some participants highlighted the special circumstances of small island developing states and their vulnerability to climate change.

While renewing their commitments to the Rio Declaration on Environment and Development, and the provisions of Agenda 21, the participants built upon the key issues identified during CSD-9, taking into account the findings of the World Energy Assessment.

The options and strategies are set out in three sections below, corresponding to national, regional and global levels. These proposals and recommendations are intended to serve as an input to the preparatory process to the World Summit on Sustainable Development.

1. At the national level:

- Carry out policy changes in the energy sector in order to increase access to energy supply markets and energy services in rural areas and urban poor. Simultaneously, poverty reduction strategies should include improving access to energy services as a component;
- Institute a legal framework to implement mandatory energy efficiency norms, standards, labelling and targeted energy capacity addition based on renewable energy;
- Establish independent regulatory mechanisms for introducing market-based instruments to foster competition;
- Establish appropriate frameworks for public—private partnerships involving government, private sector, local communities, community-based organizations and NGOs, in planning, decision making and implementation of energy initiatives for sustainable development;
- Establish a dedicated fund to promote and support research, development, demonstration and commercialization of indigenous energy technologies;
- Develop guidelines and carry out mandatory sustainable development impact assessment for all energy projects;
- Adopt a holistic approach for integrating economic, social and environmental considerations for effective planning, coordination and implementation of energy activities for sustainable development through appropriate institutional coordination mechanisms;

- Build and enhance institutional and human resources capacity for all of the above through specially designed programmes including programmes for women, as well as for people at the local level.

2. At the regional level:

Regional and sub-regional organizations/agencies are urged to assist national governments and other stakeholders to:

- Strengthen existing forums for enhanced inter-governmental cooperation while encouraging the participation of civil society in such forums;
- Strengthen existing or establish networks of institutions of excellence at regional and global levels;
- Promote and strengthen regional and interregional dialogue forums involving producers and consumers of energy;
- Strengthen and promote cross border energy exchange, to fully utilize sub-regional and/or regional energy potential;
- Establish mechanisms for facilitating the transfer of technology and cooperation on the sharing of information and experience, including through south-south cooperation as well as partnerships among similarly placed groups of countries.

3. At the global level:

Global institutions/organizations/agencies including the United Nations system and donors are urged to form partnerships to support global initiatives to:

- Provide technical and financial assistance for developing and harnessing local renewable resources and promoting energy efficiency;
- Support region-specific programmes on energy for poverty alleviation;
- Establish a risk management fund to mitigate the risk of private sector investment in new and emerging clean energy technologies;
- Establish market transformation initiatives in developing countries with support from the international community, based on innovative energy supply market and energy service delivery mechanisms through small and medium enterprises (SMEs);
- Establish a global partnership for financing energy for sustainable development, for assisting developing countries by mobilizing, providing, and coordinating financial resources to them with the participation of relevant international organizations and entities active in the financing of energy activities for sustainable development;
- Encourage innovative partnerships to facilitate fuel switching in support of cleaner fuels and technologies;
- Establish a Clearing House Mechanism (CHM) for exchanging information and experiences worldwide on available energy technologies and good practices in policies and measures for achieving the goals of sustainable development.

Energy is linked to major global issues such as poverty, health, education, gender, and environment. The existing mechanisms address certain aspects of these issues. To facilitate the adoption of a holistic approach, new partnerships and linkages are needed for bringing about greater coordination for planning and implementation of energy activities for sustainable development.

In this context, the actions, mechanisms and partnerships proposed above could constitute building blocks for a world initiative on energy for sustainable development. A combination, or a selection of these mechanisms, could provide the basic elements for designing the framework for such an initiative. The Delhi Round Table, therefore, recommends that steps be taken towards this end.

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