

A Framework for Action on Energy



WEHAB Working Group
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Contents

Preface and Acknowledgments	5
Energy: Key Issues and Challenges	7
Addressing the Challenges in Energy	11
Energy: Frameworks for Action	15
<i>Annexes</i>	
Major Agreements on Energy and Their Objectives	27
UN System Capacities in Energy	31



Preface and Acknowledgments

The WEHAB initiative was proposed by UN Secretary-General Kofi Annan as a contribution to the preparations for the World Summit on Sustainable Development (WSSD). It seeks to provide focus and impetus to action in the five key thematic areas of Water, Energy, Health, Agriculture and Biodiversity that are integral to a coherent international approach to the implementation of sustainable development and that are among the issues contained in the Summit's Draft Plan of Implementation.

The five thematic papers are based on initial consultations with concerned agencies of the UN System and are not intended to be consensus documents reflecting the totality of UN System activities in these areas. They do, however, try to provide a broad view of existing normative and programmatic frameworks in each area, to highlight interlinkages among the sectors, to identify key gaps and challenges and to highlight areas where further action is needed.

The WEHAB initiative also responds to resolution 55/199 of the UN General Assembly that mandated the WSSD preparatory process and decided that the Summit should focus on areas where further efforts are needed to implement *Agenda 21* and that action-oriented decisions in those areas should address new challenges and opportunities. In that regard, the initiative takes fully into account the text of the Draft Plan of Implementation agreed at the fourth meeting of the Preparatory Committee for the WSSD in Bali, as well as existing agreed multilateral frameworks. It includes proposals for a number of targeted actions in each of the sectoral areas that are anchored in various intergovernmentally agreed multilateral frameworks on the basis of an incremental approach to meeting broad targets.

The UN General Assembly, in resolution 56/226 on the World Summit on Sustainable Development, also encouraged new initiatives that would contribute to the full implementation of *Agenda 21* and other outcomes of UNCED by strengthening commitments at all levels, including by reinvigorating global commitment and partnerships, both among governments as well as between governments and major groups. Partnerships have thus emerged as an important aspect of the further implementation of *Agenda 21*. While partnerships may involve several actors and be of a broad nature, the WEHAB initiative, drawing as it does on intergovernmental frameworks, could provide a structure for partnerships in these five areas and in this regard could potentially serve as a framework for benchmarking action and monitoring progress in the follow-up to the WSSD.

Due to constraints of time, the initial approach taken in the preparation of the WEHAB initiative was, of necessity,

somewhat selective and is not meant to imply any priorities at this stage. If member states believe that a co-ordinated approach to implementation in these areas is required, however, the WEHAB initiative potentially provides a framework for the development of a coherent and co-ordinated follow-up by the UN System based on the intergovernmentally agreed outcome of WSSD. As such, it should be seen as the beginning of a process of follow-up by the UN System.

More than 100 people contributed to the production of these booklets. The list is too long to name everyone here. The names that follow are of individuals who spent a great deal of their time in drafting, providing texts, reading material and giving overall advice. This project would have never been possible without the exemplary joint team work. This is, in fact, an example of the outstanding capacities of the UN System and the World Bank and their capacity to produce team work in record time with very good quality.

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Other staff members of the many agencies listed on the inside back cover provided a number of useful inputs and contributions. Many of them, as in UNEP, FAO and WHO, spent a great deal of time reviewing and providing texts. They are too many to list but we appreciate their timely and valuable inputs. We would like particularly to thank UNEP, UNDP, the World Bank's Environmentally and Socially Sustainable Development Network, UNDESA, UNIDO and WHO for the valuable and substantive support and for placing a large number of the core staff and resources at our disposal.

The project benefited greatly from the contributions of High-Level Advisors who took time to read various drafts and provide useful comments: Margaret Catley-Carlson, Hartwig de Haen, Gourisankar Ghosh, Thomas Johansson, Sir Richard Jolly, Stephen Karekezi, Roberto Lenton, Pedro Sanchez and M.S. Swaminathan. The project also benefited from the work of the Millennium Project and its director, Professor Jeffrey Sachs, Director of the Earth Institute of Columbia University.

For the energy volume, special thanks go to Stephen Karekezi and Thomas Johansson, who acted as High-Level Advisors, readers and contributors. Ellen Morris, energy consultant to UNDP, provided valuable texts and, under the direction of UNDP, was a valued contributor. Several other staff of UNDESA, UNDP and UNIDO also supported the preparation of the volume, and to them we are grateful. UNEP, particularly Mark Radka, provided useful comments throughout the text.

We would also like to thank the team that produced the booklets, especially Jane Coppock of the Yale School of Forestry & Environmental Studies, who managed the production; Dottie Scott, page layout; and Yale Reprographics and Imaging Services (RIS), which did the design and printing. They put in a great deal of effort to make this project happen. We thank them.

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Last but not least, this project would never have seen the light of day without the unstinting efforts of Luis Gomez-Echeverri of UNDP, who came to New York to lead the WEHAB Working Group and to manage the project that produced these contributions to WSSD in a very short period of time.

Nitin Desai
Secretary-General
World Summit on Sustainable Development



Energy: Key Issues and Challenges

Energy services are essential for sustainable development. The way in which these services are produced, distributed and used affects the social, economic and environmental dimensions of any development achieved. Although energy itself is not a basic human need, it is critical for the fulfilment of all needs. Lack of access to diverse and affordable energy services means that the basic needs of many people are not being met.

Energy services include things such as lighting, cooking, heating and cooling, water pumping, refrigeration, transportation and communication. All these can be produced from both conventional and renewable sources of energy. Without access to energy services, people must spend a great deal of time and physical energy on basic subsistence activities rather than on earning money. In addition, lack of energy correlates closely with many indicators of poverty, such as poor education, inadequate health care and hardships imposed on women and children. At the local and national levels, a reliable energy supply is essential to economic stability and growth, jobs and improved living standards.

Current patterns of energy supply and consumption are clearly unsustainable. Nearly one-third of the world has no access to electricity, and another third has only poor access. Reliance on traditional fuels for cooking and heating can have serious impacts on the environment and on people's health. Furthermore, wide disparities still exist in the levels of energy consumption within and between countries, with the richest people in the world using nearly 25 times as much energy per person as the poorest people.

Major changes in existing energy services delivery systems are required so that energy can become an instrument for sustainable development. Shifting the existing supply model to a focus on energy services will require fundamental readjustments of public policies to promote and adopt sustainable energy. The growing demand in developing countries for energy services presents a historic opportunity to satisfy demand in ways that are compatible with sustainable development. If renewable energy, energy efficiency and clean conventional technologies are more widely used, with a focus on decentralized systems, benefits can be reaped for economic and social development as well as for environmental protection.

The social issues linked to energy use include poverty alleviation, opportunities for women, the demographic transition and urbanization. Overall, limited access to energy services marginalizes poor people and seriously limits their ability to improve their living conditions. The poor typically spend a

greater portion of their income than the rich do on indispensable energy services, such as cooking. At the same time, they frequently forgo or compromise on services like lighting and space heating.

Modern energy services can be a vital entry point for improving the position of women in households and societies. It is mainly women who do the cooking, so they and their children are most vulnerable to indoor air pollution from cooking fires. In addition, as traditional fuels become scarcer, girls are often withdrawn from school because more time is required for the collection and transport of fuels. This can have lifelong effects on literacy, family size, well-being and economic opportunities for women. Energy use patterns also influence population growth by affecting social and economic conditions that have an impact on family size. The deployment of energy for industries that generate employment and income for women can help delay the age of marriage, which is an important determinant of fertility.

The rapid and uncontrollable growth of major urban centres is another key issue linked to energy. Although the general trend towards urbanization has many components, giving rural residents more options through energy interventions and providing improved energy services to smaller towns could potentially slow urban migration and reduce pressures on large cities. Taking energy issues into consideration in land use planning and in designing physical infrastructure, construction standards and transportation systems can reduce some of the growth in energy demand that accompanies rapid urbanization and can improve the quality of the urban environment.

- Some 1.7–2 billion people in the world, mostly in rural areas, have no access to electricity; a further 2 billion are severely undersupplied.
- One-third of the world relies on traditional fuels—wood, dung and agricultural residues—to meet their daily heating and cooking needs.
- The world's billion poorest people use only 0.2 tonnes of oil-equivalent energy per capita annually, while the billion richest—those earning on average over US\$20,000 a year—use nearly 25 times as much.
- World energy systems are responsible for more than half the greenhouse gas emissions due to human activities; most of these emissions are due to fossil fuel use.



Improved social services, including health care, education and communication, require reliable energy services. These can help improve educational facilities and services, allowing both children and adults to become literate or improve other skills. For example, women and girls could spend less time gathering firewood, fetching water and cooking and instead focus on education. Access to communication services is particularly important for improving life for people in rural areas, and television and radio—the primary modes of communication—almost invariably require electricity.

Energy use is also strongly linked with the second pillar of sustainable development: economic growth. Energy services are needed to create jobs, develop industries, enhance value-added economic activities and support income-earning activities in rural areas. Fuels are essential for heat-using processes, transportation and many industrial activities. Electricity is an essential input to modern productive activities as well as communication and service industries.

Energy services aid economic development at the local level by raising productivity and enabling local income generation through improved agricultural development and non-farm employment. The availability of jobs, productivity increases or economic opportunities is severely limited without access to modern energy services and fuels—which can catalyse the creation of micro-enterprises, livelihood activities beyond daylight hours and locally owned businesses.

Interruptions of energy supply can cause serious financial, economic and social losses. Energy must be available at all times, in sufficient quantities and at affordable prices, to support the goals of sustainable development. From a balance-of-payments perspective, energy imports are currently one of the largest sources of foreign debt for many of the poorest countries. In addition, investments that were made in high-cost centralized conventional energy installations have contributed to the growth of foreign debt. In over 30 countries, energy imports exceed 10 per cent of the value of all exports; in about 20 countries, payments for oil imports exceed those for external debt servicing.

Attention to energy security is critical because of the uneven distribution of both fossil fuel resources and the capacity to develop other resources. Although energy security has been adequate for the past 20 years, and has in fact improved, there is potential for conflict, sabotage, disruption of trade and reduction in strategic reserves. Moreover, development of indigenous energy resources and diversification of the

energy supply can reduce long-term dependence on imported oil and can lower national debts, thereby improving economic conditions and benefiting the poor.

Meeting the rapidly growing energy needs of present and future populations in developing countries will require large capital investments. It is estimated that developing countries need to invest on the order of 2.0–2.5 per cent of their gross domestic product over the next 20 years if they are to achieve economic prosperity. With appropriate pricing and regulatory policies, investments in the energy sector would raise revenues to cover operating costs and generate returns sufficient to attract large-scale private finance and investment.

Indeed, political determination to accelerate and steer the innovation process is crucial in reshaping energy systems so that they support sustainable development. Technology innovation leading to the development and adoption of clean and affordable energy technologies is not happening fast enough or on a large enough scale to meet the growing demand in developing countries. Moreover, innovations and reductions in the cost of renewable energy, energy efficiency and clean conventional technologies will depend heavily on policies and investments made by industrial countries.

The growing demand in developing countries for energy services presents a historic opportunity to satisfy demand in ways that are compatible with sustainable development.

The environmental effects of energy use—the third pillar of sustainable development—can occur at many levels, from the household to the global, and include such consequences as desertification, acidification, air pollution and climate change. (Land degradation and acidification, which have direct linkages to the agriculture and water sectors, are discussed later in this chapter.)

The combustion of fossil fuels is the largest source of health-damaging air pollutants, as well as being the major source of greenhouse gas (GHGs) emissions. The emission of fine particulate matter—from the burning of coal, oil, diesel fuel, gasoline and wood in transportation, power generation and space heating—can lead to respiratory problems and cancer. Indoor fires burning coal, wood or other biomass fuels are also a significant source of particulate pollution in rural homes. Smoke from cookfires contains dangerous amounts of toxic substances and can also lead to respiratory problems.

At the global level, one of the most serious environmental problems today is the steady and long-term increase in atmospheric concentrations of GHGs, which is causing changes in climate patterns. Although climate change is a global phenomenon, and although industrial countries are



the principal source of GHGs, the negative effects will be most severe in developing nations and will be felt most by poor people. Fossil fuels, a principal source of GHGs, represent about 75 per cent of total energy use.

The many facets of the critical need for energy services and the impacts of providing them are discussed in more detail in the remainder of this chapter. Within the context of the priorities identified by Secretary-General Kofi Annan, there are direct links among the five key areas where concrete results can and must be obtained: water and sanitation, energy, health and the environment, agriculture and biodiversity and ecosystem management (WEHAB). (See Figure.) For development to be sustainable, it is preferable to concentrate on delivering energy services that can meet the needs of people, using a variety of technologies and fuels tailored to local conditions, rather than simply working towards increasing fuel and electricity supplies.

Energy and Water

A priority for rural and urban communities is a reliable supply of water for drinking, domestic use and irrigation. Energy allows possible water pumping, boiling, disinfection, purification, storage and distribution. An added benefit of purifying water or pumping clean groundwater is that it reduces drudgery and the time spent collecting water, mostly for women and children. In addition, a reliable supply of irrigation water is important so farmers are able to plant more than one crop during the year, which not only increases the amount of food produced, but also improves employment opportunities.

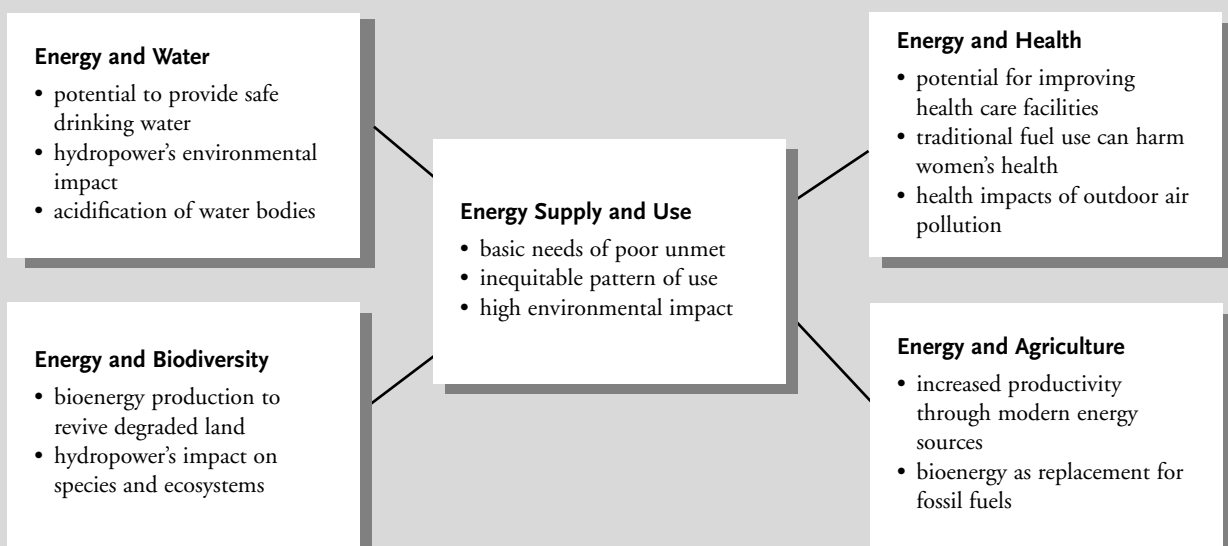
The lack of sanitation in many rural areas of developing countries is directly related to the difficulty of getting clean water. There is an energy-sanitation link because energy often has to be used to lift 'clean' groundwater or to boil water to reduce the health risk from contamination.

The acidification of water resulting from the combustion of fossil fuels is a major problem in many areas of the world. The resulting changes in the chemical composition of water affect agriculture and ecosystems. In addition, large-scale hydropower has emerged as a public concern, given growing experience with the performance and consequences of dams. While hydroelectricity can be an important energy source, key questions arise about what a dam will do to river flow and to rights of access to water and river resources; whether the dams and resulting reservoirs will uproot existing settlements, disrupt the culture and sources of livelihood of local communities or degrade environmental resources; and whether dams are the best economic investment of public funds and resources.

Energy and Health

Health care services can be improved and made more convenient by providing energy services for clinics. Most rural health facilities have limited if any energy services, and this seriously limits their ability to deliver health care services and medicine, as well as to attract and retain health personnel. With improved access to energy services, clinics can have lights, water pumps, medical refrigeration for drugs and vaccines, medical instruments, fans and sterilizers—all of which are needed to help reduce child and maternal mortality and to combat diseases. Energy services also allow more effective community education about health care.

Figure: Examples of the Critical Role of Energy in WEHAB Priority Areas



The absence of better energy services has an acute effect on the health of women who must carry heavy loads of fuel over increasingly long distances. Other health hazards arise from the fact that women do most of the cooking, as noted earlier. Indoor fires burning coal, wood or other biomass fuels are a significant source of particulate pollution in rural homes. Smoke from cookfires contains dangerous amounts of toxic substances that contribute to respiratory disease, lung diseases, cancer and eye problems. Worldwide, close to 2 million deaths per year are attributable to indoor air pollution from cooking fires.

The combustion of fossil fuels is the largest source of outdoor air pollution in the form of health-damaging pollutants such as particulates. Fine particulate emissions from the burning of coal, oil, diesel fuel, gasoline and wood can lead to respiratory problems and cancer.

Energy and Agriculture

Energy services can improve agricultural development through water pumping, crop processing and better storage and transport to market. Increased productivity can in turn enable the use of machinery and irrigation, which reduces the need to expand the quantity of land under cultivation and thus the pressure on ecosystems. Agricultural crop drying, which requires energy inputs, has the potential to reduce crop waste, improve farm productivity and lower the use of coal and wood for drying. Energy inputs are needed to expand agricultural processing opportunities to increase the economic potential of the sector and to generate jobs.

Efficient use of bioenergy resources, such as agricultural residues, can replace conventional energy and can help alleviate the pest, waste and pollution problems of residue disposal. Modern biomass power technologies hold the promise of displacing new and existing diesel generation while creating economic opportunities for rural communities.

Land degradation is a substantial problem that affects 2 billion hectares of land world-wide. The production of energy (fuel collection) is not a major cause of this global problem (although the impact may be large locally and regionally), but energy can play a role in stemming and reversing it. This can be done through the introduction of modern biomass energy systems (for electricity generation, for instance), which would put a sufficiently high market price on biomass to make it profitable to restore many of the potentially productive degraded lands to 'energy farm quality'. An important environmental consideration here is the introduction of fertilizers and pesticides used for growing bioenergy feedstock and crops. Fertilizers can lead to nutrient overloading

of surface water and harm aquatic species. In addition, persistent toxins can poison wildlife and people, with impacts ranging from cancer to immune disorders and hormone disruption. Still, good management practices can reduce or eliminate the need for fertilizers and pesticides.

Energy and Biodiversity

Bioenergy feedstock production significantly influences surrounding ecosystems, enhancing or suppressing biodiversity. The impact can be limited by preserving especially important or vulnerable habitat types. Bioenergy feedstock can itself be a high biodiversity ecosystem if several species—plants and livestock—are used to fill ecological niches. Diversifying the crops planted can also foster diversity within the ecosystems that are planted.

The biodiversity impacts of large-scale hydropower development are more negative than positive, having led, in many cases, to significant and irreversible loss of species and ecosystems. The building of large dams has resulted in the loss of forests and wildlife habitat, the loss of species populations and the degradation of upstream catchment areas due to inundation of the reservoir area and the loss of aquatic biodiversity and of upstream and downstream fisheries, as well as having numerous cumulative impacts on water quality, natural flooding and species composition when several dams are sited on the same river.

Energy and the Millennium Development Goals

The Millennium Development Goals (MDGs, see inside front cover) developed in September 2000 provide key targets to address the most pressing development needs. There is no MDG explicitly on energy, yet energy is essential for achieving all the goals set by the world's leaders. Most notably, the importance of energy in meeting the goal of halving poverty by 2015 was reflected in a key decision at the Ninth Session of the Commission on Sustainable Development: "To implement the goal accepted by the international community to halve the proportion of people living on less than one dollar per day by 2015, access to affordable energy services is a prerequisite." This underscores the need to expand greatly the availability of energy services for the poor.

Beyond this broad goal, the wide range of energy services, including cooking, lighting, heating, water pumping and transport, made possible by renewable energy, energy efficiency and clean conventional fuels can have a major impact in facilitating sustainable livelihoods and improving health and education—all important elements of the MDGs.



Addressing the Challenges in Energy

Energy is linked with practically all aspects of development and, in particular, with the other four issues in the WEHAB cluster of critical concern. Energy is an engine for growth and poverty reduction, and therefore it should be accorded high priority and reflected in policies, programmes and partnerships at national and international levels. Current energy systems are not consistent with the goals of sustainable development, however, and a fundamental reorientation is required in order to make the transition to more sustainable energy systems so that energy can become an effective tool for sustainable development.

Making the global energy system compatible with the tenets of sustainable development will require a large and sustained effort that includes awareness raising, capacity building, policy changes, technology innovation and investment. The shift towards a sustainable energy economy involves sound analysis of the options by policymakers, good decisions and the sharing of experience and knowledge of individuals and organizations wrestling with the many practical challenges that such a transition presents. These activities, and the changes they foster, are needed in industrial as well as developing countries.

Past global conferences clearly laid out the challenges to be confronted in order to make that transition happen. At the 1992 United Nations Conference on Environment and Development (UNCED), an ambitious strategy for sustainable development—*Agenda 21*—was launched. Though no specific chapter in *Agenda 21* deals with energy, the need for new and more sustainable approaches in this key area is reflected in several chapters. Since UNCED, the importance of increased attention to the role of energy in sustainable development has been affirmed at a number of UN conferences. Most notably, the Ninth Session of the Commission for Sustainable Development (CSD-9), held in April 2001, explicitly focused on energy and clearly recognized its critical role and its linkage with the three supporting pillars of sustainable development: social, economic and environmental.

The decisions reached at CSD-9 centred on options and strategies for each of the key issues related to energy supply, distribution and use. CSD-9 provided the foundation on which political commitment can be laid out to establish a blueprint for how to move forward on creating energy pathways for sustainable development that include a fundamental reshaping of policies, institutional frameworks, financial infrastructure and technical approaches. Regarding regional co-operation, CSD-9 emphasized the importance of partnerships at all levels to expand the access to energy services and engage the beneficiaries at all stages of dialogue, design and

delivery. Based on the outcomes of CSD-9, it is possible to lay out the major challenges and drivers for energy for sustainable development in the years ahead.

Accessibility

Wider access to affordable energy services is a necessary condition for meeting the challenge of the Millennium Development Goal of halving the proportion of people living on less than US\$1 a day by 2015. Indeed, greatly expanded access to reliable, affordable and socially acceptable energy services is a prerequisite to meeting most of the targets outlined in the Millennium Declaration. Energy consumption is highly uneven between North and South and, within countries, between rich and poor people.

The greatest access challenges are currently found in rural areas, though with the current trend towards urbanization in developing countries, this problem is increasingly present in large poor communities within and at the margins of cities. Rural development should be the overall priority in meeting the access challenge, with a focus on increasing investments, deploying decentralized energy systems using conventional and renewable sources, promoting local energy entrepreneurs, establishing financial mechanisms and strengthening policies and regulatory systems to expand the level of energy services.

Providing access to energy services in rural areas is a daunting challenge that is not currently receiving adequate attention or allocation of resources. For developing countries, official development assistance (ODA), which is the primary source of external funding in most countries, is declining. Public-sector investments in expanding energy services are a major cost to domestic budgets in developing countries, and in the face of macroeconomic reform they have proved ever more difficult to provide. Moreover, given the scale of the challenge for improving access to energy services and the amount of public assistance that is needed, it is clear that ODA and public-sector spending combined will be insufficient.

Exploring ways in which ODA and domestic public resources can be used to leverage private funds for energy and development will be critical in mobilizing resources that can be directed at improving the access and quality of energy services in developing countries. International co-operation and consultation will be important in improving the co-ordination of ODA, taking into account a country's needs, priorities and strategies. In addition, new methods of public/private co-operation might be necessary to attract private



capital for investments that can take place within a sound framework of policies and regulations. There is currently no global forum that could facilitate this kind of dialogue and ensure that it is carried out in a transparent and inclusive manner.

Energy Efficiency

Energy efficiency opportunities can be found in almost all energy end-uses, sectors and services, and the huge potential remains untapped. End-use energy efficiency focuses on improving the equipment that provides the services, such as measures to make heating and air conditioning equipment, appliances, lighting and motors more efficient. Supply-side energy efficiency, in contrast, focuses on performance-based improvements resulting in more-efficient energy generation, improved industrial processes, cogeneration and energy recovery systems. Measures to enhance access to technology, capacity-building, financing, market stimulation and institutional issues will help to meet the energy efficiency challenge.

Using energy more efficiently is especially important in countries with limited levels of existing installed capacity; measures to consider include energy efficiency standards, appliance and product labelling, demand-side management and building and construction standards. Given the integration of global markets, measures to improve energy efficiency can be done more effectively in the context of international and regional co-operation. There is considerable scope for North-South co-operation as well as South-South exchange of experiences and successes. Partnerships will be important for improving overall economic efficiency while producing environmental benefits at the global and national levels. Through collaboration and consultation with regional partners, setting norms and institutional frameworks to promote the integration of systems and the adoption of standards will be most effective in promoting energy efficiency gains.

Renewable Energy

Renewable energy technologies hold great potential to satisfy basic needs and to support poverty alleviation and sustainable development. There is a range of commercially available, field-proven renewable energy technologies, including solar, wind, geothermal, biomass and hydropower, but they are not yet used widely in tackling the shortfall in access to energy services. Modernized biomass approaches

for providing fuels and electricity to meet rural energy needs are particularly promising and an area ripe for technology transfer to developing countries. Pursuing this option will require unique approaches to address technology, financing and capacity development efforts to support biomass generation where the natural resource base is sufficient. The modularity and decentralized nature of renewable energy technologies make them particularly well suited for rural energy development and an environmentally sound alternative to grid extension.

To speed the introduction and adoption of renewable energy systems, the key issues are expanding access to the technologies and reducing their costs. This can be done through supportive policy measures, market incentives and promotion activities. As the Group of Eight Renewable Energy Task Force has recognized, expanding markets in industrial countries will be essential for bringing costs down. Costs cannot be reduced through activities in developing countries alone. Moreover, developing and industrial countries together will need to work to expand the manufacturing, assembly and service capabilities in developing countries to begin to make inroads in meeting the challenge of increasing access to energy services.

Enhanced regional and international co-operation will be important in identifying the appropriate entry points for supporting the expansion of renewable energy. This will likely be done through a division of labour between developing and industrial countries so that the necessary skills and resources can be allocated efficiently to the problem at hand. As in the case of energy efficiency, equipment standards and integration of systems and components will be made possible through international and regional co-operation. More international research is needed to bring modern biomass-based solutions to developing countries.

While several international organizations work in the area of renewables, there is currently no dedicated global institution that is mandated in a comprehensive way to assist developing countries and economies in transition with the development of various forms of renewable energy.

Advanced Fossil Fuel Technologies

Fossil fuels will continue to be the primary energy supply option world-wide when considered as a proportion of the global supply mix. The challenge is how to use them more efficiently and how to reduce their negative environmental

Providing access to energy services in rural areas is a daunting challenge that is not receiving adequate attention or resources.



impacts at the local, regional and global level. The transition to cleaner and more advanced fossil fuel technologies is recognized as essential to support sustainable development. This is particularly important in developing countries, where the rising demand for energy services and growing populations will drive the largest demand for new installed capacity for electricity and increased supply of clean fuels. Efforts should be focused on efficiency improvements in power plants, wider access and research and development for advanced energy systems and fuels.

In order for developing countries to move to cleaner, more advanced fossil fuel energy systems, collaboration and co-operation at the international and regional level are necessary. Given that the most rapid advances in these technologies have occurred in industrial countries, technology and information exchange will be important for speeding up the transition in developing countries. This will need to be done so that developing countries can maintain, service and potentially manufacture and assemble the equipment to enhance energy self-sufficiency and security. Regional and interregional fora could be established to help facilitate the jump to newer, advanced fossil fuel technologies.

Regulatory and financing mechanisms will serve as the foundation to encourage the adoption of clean fossil technologies. The government sets the guidelines and norms for the regulations that will make this happen in a clean and sustainable manner. For example, developing and industrial countries can set emissions standards to drive innovation and markets towards cleaner fossil fuels and technologies. A major incentive for industry leadership will be the Kyoto Protocol mechanisms, including the Clean Development Mechanism. Through this, developing countries can actively advance their sustainable development objectives while reducing greenhouse gas emissions by stimulating 'technology leapfrogging' to the advanced fossil energy technologies and by generating new investments.

Several influential private-sector organizations could play an important role in facilitating consensus-building on public-private partnerships and inter-regional co-operation in the area of advanced fossil fuels. It would seem important, however, to ensure that these organizations operate in a transparent and participatory manner and that some sort of inter-governmental guidance is exercised in terms of how they function.

Energy and Transport

Transport—the most energy-intensive sector—is viewed as a key challenge for sustainable development. Transport causes pollution that has adverse effects on the environment at the global, regional and local level and that harms human health. Furthermore, limited access to transport is often cited as a contributing factor to poverty. The two major challenges for energy and transport are the wider adoption of cleaner fuels and modal shifts to cleaner and more efficient forms of transport. Energy challenges in this sector and the negative environmental effects are most acute in industrial countries, but are also a problem in developing countries. Integrated approaches to transportation that include improved planning, demand management, fuel efficiency and cleaner fuels can help to meet the transport challenge.

Promoting emissions standards through co-operation among the countries of a region and with the support of the international community could be effective in setting and enforcing standards that would improve local and regional air quality. Because lead in gaso-

line is a major problem in developing and industrial countries, a lead-free initiative that supports the transition to cleaner fuels would go a long way towards engaging international and regional partners in addressing emissions problem. Other measures that could be introduced include fuel and vehicle standards, inspection and maintenance programmes and improved urban and rural planning.

Modal shifts away from individual cars to mass transit will have long-term benefits for individuals and the region as a whole. Countries with little or no transportation infrastructure have the chance to embark on an overall system that is cleaner and more sustainable, including improved rail, bus and subway options. With economic growth, globalization and the expected increases in world trade, the need for international and regional co-operation on transport is highlighted. Because of the large capital investments required for infrastructure, innovative approaches and public-private partnerships will be essential in making the shifts necessary for sustainable development.

Developing and industrial countries can set emissions standards to drive innovation and markets towards cleaner fossil fuels and technologies.



Energy: Frameworks for Action

The World Summit on Sustainable Development (WSSD) is a unique opportunity for the international community to provide inputs on specific initiatives and approaches that would allow the recommendations on energy for sustainable development from the Ninth Session of the Commission on Sustainable Development (CSD-9) to be translated into practice. During the preparatory process leading up to the WSSD, a number of stakeholders expressed their interests in a range of broad areas related to energy for sustainable development. This chapter is intended to facilitate the process and discussion on energy at the Summit and beyond by providing guidance on areas where targeted actions are needed, some of which may lend themselves to new or enhanced partnerships on energy for sustainable development.

Energy for sustainable development was discussed at the intergovernmental level for the first time at CSD-9; broad consensus was reached on key energy challenges, and recommendations were made on how these challenges could be met. The previous chapter highlighted a set of five key issues/challenges as well as seven cross-cutting issues related to energy for sustainable development that are drawn from CSD-9. The five key issues are:

- access to energy and modern energy services,
- energy efficiency,
- renewable energy,
- advanced fossil-fuel technologies and
- energy and transport.

The overarching issues that were highlighted at CSD-9 included research and development, capacity building, technology transfer, information-sharing and dissemination, mobilization of financial resources, making markets work effectively for sustainable development, and multistakeholder approaches and public participation. These so-called cross-cutting issues can provide the basis for further action in the implementing actions that address the five key challenges.

At CSD-9, governments agreed that in order to make energy systems more supportive of sustainable development objectives, contributions from all stakeholders, as well as increased investments, would be needed.

What are urgently needed now, in addition to policy responses, are adequate delivery mechanisms and a renewed

commitment that will lead to improved implementation of relevant strategies at the national, regional and global levels. This chapter seeks to provide a road-map for action and examples of priority activities associated with each of five challenges where breakthroughs are needed. Actions that are required with respect to each of the cross-cutting issues have been listed to provide guidance on how the goals of CSD-9 can be turned into reality.

Frameworks for Action

Energy issues are addressed in different countries in different ways, depending on the national energy situation. Because energy issues transcend boundaries, global goals and targets can be useful to provide guidance on the priority national issues to address. International co-operation in energy is needed more than ever in order to achieve the Millennium Development Goals. In addition to efforts being made by the United Nations System, new initiatives are needed to intensify international co-operation in order to mobilize investments in energy for sustainable development. As part of such efforts, concrete actions are needed to build effective public-private partnerships and to strengthen capacities in developing countries to undertake policies and programmes that use energy as an instrument to support sustainable development. There is also need for appropriate mechanisms to foster increased co-operation among organizations and institutions, both North-South and South-South.

Clearly, the scale and magnitude of tasks involved in progressing towards the objective and goals of energy for sustainable development are so enormous that, in addition to national efforts, international, regional and sub-regional co-operation are of critical importance. Cross-cutting issues that were highlighted at CSD-9 provide the entry points by which actions relating to specific challenges can and need to be implemented. In other words, these cross-cutting issues allow for a host of actors to respond to existing obstacles and implement action related to the broad objectives of energy for sustainable development.

To achieve tangible progress in all these areas, actions are needed that include, for example, building capacity and facilitating information dissemination related to energy for sustainable development; integrating national energy policies with the economic, social and environmental goals of sustainable development; ensuring equitable access to energy services, with a particular focus on energy needs of poor people; accelerating rural energy development, including electri-



fication of rural areas through grid extension and through decentralized renewable energy options; directing market forces towards environmentally optimal solutions by creating an enabling policy environment and regulations so that markets can work better; developing locally available energy resources for greater energy security through diversification; and improving access to and transfer of environmentally sound technologies.

At the regional and international levels, actions are needed in terms of elements that include, for instance, strengthening regional and international co-operation for energy security and market stability; expanding the use of energy efficiency and renewable energy as well as advanced fossil fuel technologies; building institutional and human resources capacities; mobilizing financial resources in support of national

efforts; improving access to information and decision-making on technologies and policies; and promoting the participatory approach by involving all relevant stakeholders.

Currently there is no international or intergovernmental process to host or facilitate dialogue on priority energy issues. Concerted action at the international level to support energy systems development consistent with domestic, regional and global sustainable development priorities is required. Such a process is also needed to create a forum for dialogue among international institutions, industry, government, financial institutions, technology developers and representatives of civil society. This would enable processes to monitor the progress on energy issues that is needed to reach globally agreed development targets.

Access to Energy and Modern Energy Services

Action Area 1: Reduce poverty by providing access to modern energy services in rural and peri-urban areas.

Indicative Targets

To achieve the MDG of reducing the proportion of people living in extreme poverty by half, commensurate decreases in the number of people without access to electricity and clean cooking fuels are required. This implies targeting 800 million to 1 billion people to be provided with modern energy services by 2015. This corresponds to half of the estimated number of people currently living in extreme poverty. Appropriate intermediate targets to achieve this are required.

Examples of Activities

Integrating poverty reduction goals into energy sector planning and focusing on policy approaches that address needs of rural and peri-urban poor.

Developing integrated and holistic rural energy strategies and programmes.

Establishing financing mechanisms and frameworks at all levels with focus on micro finance.

Building local capacity through involvement of community-based organizations and relevant energy service providers.

Action Area 2: Improve health and reduce environmental impacts of traditional fuels and cooking devices.

Indicative Targets

The 400 million households that currently depend on traditional fuels need access to modern efficient cooking fuels and systems. This will contribute to addressing gender inequity at the household and community level. Appropriate intermediate targets are required to achieve this.

Examples of Activities

Developing and applying cost-effective energy technologies and systems for household use.

Increasing the availability of clean liquid and gaseous fuels for household and community use, particularly in rural areas.

Actions to Address Cross-cutting Issues

Capacity building for development planners, energy officials, and local government on the role of energy in meeting poverty reduction objectives and sectoral planning goals (such as health, education, agriculture), focusing on concrete policy options and financing strategies.

Support cross-sectoral dialogue between government agencies as well as energy service providers, with objective of linking energy goals to poverty reduction and national sustainable development planning processes.

Document the ability to pay for energy services among the poor, as a means of determining the full scope of energy markets.



Establishing relevant programmes and mechanisms to develop local capacity.
 Establishing financing and micro-credit facilities.
 Strengthening community-based organizations.

Action Area 3: Improve access to affordable and diversified energy sources in Africa.

Indicative Targets

Substantially increase access to modern energy services from an estimated baseline situation of 10 per cent of the population in rural sub-Saharan Africa. Develop appropriate institutional and regulatory frameworks.

Examples of Activities

Increasing human, financial and institutional capacity for decentralized rural energy systems.
 Promoting increased financial and institutional capacity for grid extension.
 Developing training activities for energy service providers, energy planners, non-governmental groups and local communities.
 Introducing incentives and innovative financing mechanisms at all levels to promote energy access.
 Establishing linkages to productive applications for income generation.

Introduce energy service financing and affordable payment systems so that poor people can expand their participation in energy markets.

Set priorities for research and development activities on technologies and approaches that meet the needs of the poor and that provide energy options to expand social services, especially in rural areas. Emphasis should be placed on innovations relating to decentralized systems using both conventional and renewable energy in line with domestic resource availability.

Energy Efficiency Improvements

Action Area 4: Reduce poverty by providing access to modern energy services in rural and peri-urban areas.

Indicative Targets

In order to realize the potential of end-use energy efficiency improvements, which are estimated to be in the range of 25–40 per cent in residential and commercial buildings, industry, agriculture and transport sectors in all countries, appropriate targets for every five years are needed.

Examples of Activities

Integrating end-use energy efficiency norms, legislative and regulatory considerations into energy sector policy and planning.
 Identifying low-cost energy efficiency improvements for relevant sectors through improved operations and maintenance.
 Building capacity and expertise related to use of financial incentives and development of regulatory and market frameworks to promote end-use efficiency.

Actions to Address Cross-cutting Issues

Build institutional and human resources capacity to formulate energy efficiency policies and regulation, establish standards and norms, promote and implement plans and programmes at national, provincial and local levels.

Promote information and knowledge exchange mechanisms to share the latest advances on energy-efficient technology options and trends in energy-using equipment and power generation to support effective public and private-sector decision-making.



Action Area 5: Improve energy efficiency in all sectors using established practices on standards and labelling techniques.

Indicative Targets

Substantially increase the application of appropriate energy efficiency standards and labelling programmes from the current coverage in about 30 developing countries to a much larger number.

Examples of Activities

Establishing agreed standards and labelling criteria/procedures based on national needs.

Encouraging use of innovative business and financing mechanisms to promote use of standards and labels, including through appropriate information and communication technologies.

Promoting transfer and exchange of policy and technology experiences related to energy efficiency standards and labelling.

Create market mechanisms through incentives, finance and credit arrangements, as well as pricing reforms and business models for wider use of energy-efficient devices and systems across all sectors of the economy.

Establish mechanisms to involve a wide range of stakeholders (such as consumer groups, investors, women's organizations, industry associations, organized labour and media) in implementing energy efficiency programmes in the household, commercial, industrial and transport sectors.

Action Area 6: Improve efficiency in power generation.

Indicative Targets

To improve the efficiency of converting fuels to power from the current low levels, it is necessary to substantially increase the share of modern electricity generation technologies, such as natural gas-based combined cycle, in national supply mixes.

Examples of Activities

Reducing energy losses in transmission and distribution through technical measures and systems management improvements.

Promoting the use of computerized control systems in electricity generation, transmission and distribution.

Upgrading and implementing efficiency standards for power generation industries.

Encouraging the use of integrated resource planning techniques for power generation investment projects.

Provide public funding for energy efficiency R&D on energy-producing and energy-using plant and equipment and encourage R&D in industry through targeted incentives.

Renewable Energy

Action Area 7: Progressively increase contribution of renewable energy mix of all countries.

Indicative Targets

Progressively increase the contribution of renewable energy in the global primary energy mix from the current base line of 2 per cent for modern renewables. For example, at the current rate of expansion, wind energy is expected to increase from the existing generating

Examples of Activities

Integrating renewable energy goals and full-cost accounting of environmental and health benefits of renewables into national energy sector planning and implementation.

Actions to Address Cross-cutting Issues

Give emphasis to expanding the share of renewable energy in industrial-country markets to expand use and reduce prices so that these technologies become more accessible in developing-country markets, thereby making global markets work better.



capacity of 25,000 MW to 100,000–150,000 MW in the next decade. Targets are required to generate similar trends in other forms of renewable energy such as biomass, solar, hydro and biofuels.

Creating a level playing field (rational subsidy policies, regulatory, institutional and financial arrangements) to facilitate adoption of relevant renewable energy systems.

Expanding the use of renewable energy applications through building on existing experiences (such as solar home systems).

Strengthening domestic business capacities and linkages with international private sectors.

Developing mechanisms, capacity for technology transfer and adaptation of renewable energy applications.

Building public awareness to increase of renewables through diverse means, including information and communication technologies.

Introduce supportive policy frameworks to expand the use of renewable energy in the domestic supply mix through legislative, regulatory, incentive and pricing mechanisms.

Greatly increase R&D on renewable energy from both public- and private-sector funding to support innovation, with special attention to the renewable energy applications needed for productive uses to support economic development and poverty reduction.

Action Area 8: Improve access to basic health care and education for poor people through the provision of renewable energy systems in primary health care centres and schools.

Indicative Targets

At 1–2 kw per health care centre, 100–200 Mw capacity is required for 100,000 health care centres (vaccine refrigerators, water pumps and other allied health systems).

At 500 w per school, 100,000 schools require 50 Mw capacity.

(Particular focus on rural and remote areas.)

Examples of Activities

Convening a multistakeholder consultation process to establish relevant baseline needs regarding renewable energy systems to be used by primary health care centres based on local needs and with inputs from WHO and other health care organizations.

Promoting capacity development initiatives that facilitate local involvement, including through learning and training workshops.

Encouraging civil society participation in providing resource contributions.

Provide training for education and health officials as well as service providers on renewable energy technologies and applications.

Expand new financing mechanisms at the global, national and regional level to support the increased use of renewable energy to meet social, environmental and productive goals.



Action Area 9: Promote the use of renewable energy in vaccine and immunization programmes.

Indicative Targets

To support the achievement of the MDG on reducing under-5 mortality by two-thirds, provide all vaccine and immunization programmes and centres with appropriate renewable energy systems (to suit local conditions). The average vaccine refrigerator requires 250–500 w.

Examples of Activities

Convening a multistakeholder consultative process to establish base lines regarding renewable energy systems applications that are applicable for use by vaccine and immunization programmes.

Establishing partnership modalities with Global Alliance for Vaccine and Immunizations or other interested groups to engage in pilot applications.

Documenting and sharing lessons learned from pilot applications to facilitate broader-scale implementation.

Action Area 10: Provide the use of renewable energy to facilitate access to safe drinking water.

Indicative Targets

To support the achievement of the MDG to reduce by half the proportion of people who do not have access to safe drinking water, it would be necessary to reach 500 million people with 40 litres per capita, which would require 1 million water pumps. (One pump is expected to serve on average 500 people in a community.)

Examples of Activities

Providing training for water-sector planners and service providers on renewable energy options (solar, biomass systems, wind pumps and so on) to support water pumping for drinking purposes.

Convening a multistakeholder process to involve all interested actors and develop co-ordinated linkages between renewable energy use and safe water needs.

Establishing relevant base-line needs and capacity assessments addressing renewable energy applications and safe water.

Establishing mechanisms for capacity development, information dissemination and exchange on the role of renewable energy in water pumping.

Remove current barriers to the financing of renewable energy, including through capacity building in the credit sector.

Create mechanisms to provide accurate information on the technical, economic and social viability of renewable energy technologies to support awareness raising on options that do exist and can be harnessed to address the multiple dimensions of sustainable development.



Advanced Fossil Fuel Technologies

Action Area 11: Increase the use of advanced fossil fuel technologies for energy generation.

Indicative Targets

Assuming that capital stock renovation of 5–10 per cent a year can be achieved, the entire energy system can be upgraded with advanced technology options in the next 20–30 years if performance criteria are explicit.

Examples of Activities

Defining national capacity and needs assessments related to advanced energy technologies.

Removing resource and policy constraints related to introduction of or increases in application and use of advanced energy technologies.

Establishing domestic performance standards for fossil-fuel-using technologies to encourage adoption of modern systems and equipment.

Supporting innovative initiatives and financing mechanisms to promote the use of advanced fossil fuel technologies.

Establishing mechanisms to enable technology transfer and training needed to implement advanced energy technologies.

Action Area 12: Promote the use of clean coal technologies (CCTs) in countries using coal.

Indicative Targets

Given current technology availability and trends, starting from 2005, 12 Gw per year of clean coal technologies in the next 10 years is feasible.

Examples of Activities

Defining national needs and capacity assessments related to application and use of clean coal technologies.

Promoting international efforts designed to adapt existing CCTs for developing country applications.

Introducing market transformation initiatives to increase commercial access of CCTs for developing countries.

Strengthening institutions to make them more able to apply CCTs.

Actions to Address Cross-cutting Issues

Build capacity, including technical and management capacity, to negotiate technology transfer and to use advanced fossil fuel technologies, emphasizing the required specialized technical skills and management ability.

Increase the reliability and availability of information on advanced energy technologies to assess their suitability and applicability in line with domestic development and resources conditions.

Address the need for expanded R&D on advanced fossil fuel technologies, especially encouraging international R&D collaboration as well as joint ventures, with a focus on developing countries.



Action Area 13: Reduce atmospheric pollution from energy generating systems.

Indicative Targets

Phased retrofitting of existing coal-fired power generating plants and introduction of new plants with low nitrogen oxide burners and particulate pollution controls will be required in order to achieve local, regional and global environmental benefits.

Examples of Activities

Developing public awareness campaigns aimed at introducing pollution controls on coal-fired plants.

Convening relevant public-private fora or mechanisms that will result in technology transfer and delivery of controls for use in relevant plants.

Training technical personnel on the installation and use of particulate control technologies.

Action Area 14: Enhance productivity through advanced fossil fuel technologies.

Indicative Targets

Progressively increase the share of modern energy technologies as a means to support economic productivity and development.

Examples of Activities

Expanding R&D on modern energy technology options with lower operating costs and greater environmental benefits.

Documenting and sharing information on productivity gains and economic benefits associated with new energy technologies in heat-using industries.

Expanding the use of closed-loop productive processes in manufacturing, using waste streams as energy resources.

Promoting information-sharing mechanisms in industry on new energy technologies.

Develop strategies based on gasification of fossil fuels and poly generation to produce electricity, heat and new fuels to support changes in energy systems globally.

Increase public-private partnerships to mobilize financial resources to expand the use of advanced fossil fuel technologies and to establish co-operation in risk management.

Establish appropriate market mechanisms and incentive structures to accelerate the adoption of advanced fossil fuel technologies while addressing priority actions to remove barriers to such expansion.



Energy and Transport

Action Area 15: Improve air quality and public health through the introduction of cleaner vehicular fuels.

Indicative Targets

Phasing out of lead in gasoline, reduction of sulphur and benzene in fuels and reduction of particulates in vehicle exhaust in all countries.

Examples of Activities

Assisting in policy formulation to overcome existing technical, financing and capacity constraints related to vehicles and fuels.

Promoting appropriate legislative frameworks and measures for the introduction of cleaner fuels and alternative vehicle use.

Establishing targets and timetables to phase out lead in gasoline.

Action Area 16: Implement better transportation practices and systems in mega-cities.

Indicative Targets

Implementation of sustainable transport in mega-cities focused on cleaner fuels, technology advancement and modal shifts, particularly in developing countries.

Examples of Activities

Integrating transportation issues into development plans of mega-cities.

Establishing national and local-level collaboration towards the adoption of appropriate fuel efficiency standards for vehicles that can be put into place in mega-cities.

Introducing regulatory and policy reforms that will facilitate standardization of vehicular inspections, overcome obstacles to introduction of alternative transportation modes and encourage energy efficiency in road transportation in mega-cities.

Developing public awareness campaigns in mega-cities such as car-free days, business incentives for using alternative transportation modes and so on.

Actions to Address Cross-cutting Issues

Build capacity to develop policy and legislative frameworks to implement measures required for modal shifts, develop mass transport systems, include transport considerations in settlement planning and support the transition to the use of cleaner fuels in transport.

Encourage R&D collaborations and joint ventures in emerging transport technologies such as electric, electric hybrid and fuel cell vehicles.

Promote public-private partnerships to mobilize financial resources required for transport infrastructure, sustainable transport strategies for mega-cities and rural transport.



Action Area 17: Promote new technologies for transport.

Indicative Targets

Progressively increase the share of new technologies in transport, including three-wheelers or buses, through expanded use of new fuels, compressed natural gas vehicles, electric and electric hybrids and fuel cell vehicles.

Examples of Activities

Establishing relevant global or regional mechanisms that can overcome existing policy, financing and market barriers related to the four main types of alternative vehicles.

Promoting linkages with mega-cities to develop industry incentives and programmes for market introduction of alternative transport technologies.

Building relevant infrastructure (fuelling stations) to allow for commercialization of alternative transport vehicles.

Promoting renewed engagement with automobile manufacturers to achieve commercialization of promising new technologies.

Promoting programmes to develop new fuels from biomass and coal (such as ethanol or DME) to increase fuel options and support sustainable development.

Improve compilation and analysis of transport-related information and establish databases to promote information sharing, especially on successful transport models in line with the objectives of sustainable development.

Promote regional and international cooperation to minimize trans-boundary air pollution arising from transport systems

Building and Implementing Partnerships

The international community has a vital role to play in helping developing countries achieve energy objectives for sustainable development. Clearly, various co-operative actions are needed on the part of governments, businesses, civil society, international organizations and other relevant stakeholders to address the challenges. Forging partnerships among all stakeholders therefore constitutes a key component of this action agenda. This section provides a brief summary of some of the critical elements required for building and implementing partnerships in energy.¹

The CSD, based on the preparatory process leading up to the WSSD, has envisaged that forming and promoting new and innovative partnerships will be critical to meet the challenges articulated in this paper. These partnership initiatives are foreseen to be basically of a voluntary nature—agreed on through mutual consultations among the stakeholders. The main focus of these initiatives will be to supplement and complement the WSSD-negotiated outcome and the ongoing work by governments and other stakeholders in the implementation of *Agenda 21*. As such, the partnership initiatives will give rise to a series of commitments and action-oriented coalitions focused on deliverables and would contribute to translating the political

commitments into action. In response to a wish for additional guidance on the elaboration of partnerships expressed during the informal meetings on partnerships in PrepCom 3, an addendum to the Chairman’s explanatory note, entitled “Further Guidance for Partnerships/Initiatives”, has also been provided.²

The critical issue is how to translate the idea of partnership building from global or regional-level discussions and advocacy campaigns into local actions. New and innovative partnerships will have to be formed that may involve a wide range of stakeholders and may have many different kinds of ways for partners to participate.

A framework is proposed here to facilitate this process without which individual partnership initiatives devised by a wide range of actors may result in duplication of efforts and restrictions on resource inputs by stakeholders:

Consultative process. All partnerships begin with a dialogue. This can be initiated by a lead partner or partners, by a global consensus or by some other catalyst. The role of a champion or lead partner in moving the partnership forward in the early stages is critical. A broad consultative process for partnerships may also be necessary to assist in sharing experiences and learn-



ing at all levels (local, national, regional and global), as individual initiatives will not be isolated but can be informed by and grow from broader processes and initiatives.

Definition of objectives. The next step is scoping and definition of objectives, targets, activities and implementation and coordination arrangements associated with the partnership. This requires consultation among different actors in order to harmonize the views and needs of all stakeholders—donors, participating institutions, technical groups and recipients. Underlying principles around which partnership objectives could be defined are: ensuring mutuality of interests, promoting a shared sense of purpose, and engendering respect for all stakeholders.

Mobilization of resources. This stage in the process is crucial to the overall success of the partnership, as it results in the provision of actual (financial, institutional and human) resource inputs. This stage often needs to be initiated in conjunction with the task definition work done by stakeholders.³

Implementation of partnership. All partnerships are dynamic processes or works in progress, and the stage at which the partnership is actually launched or implemented provides all stakeholders with an opportunity to see partnership activities and organizations in operation. Partners can also use this as an opportunity to examine whether additional skills and resources are needed to strengthen the partnership.

Tracking progress and results. At this stage, the partnership initiative is already under way and all stakeholders can now review and evaluate existing operations and experiences. The tracking of short-, medium- and long-term results is crucial in the evolution and growth of a partnership and should allow for modifications and further refining of tasks and activities based on results/targets achieved.

Scaling-up of partnership initiatives. Once a partnership initiative has been established, appropriate steps are needed to scale up and link with other activities in contiguous areas. Going to scale requires the adoption of partnership strategies and linkage mechanisms that can meet challenges involved in achieving agreed objectives.

All initiators of partnerships were invited to complete and submit an Information Sheet related to a specific initiative to the WSSD Secretariat.⁴ The Secretariat has posted on its Web site all partnership proposals received. Detailed information on these may be obtained from the official Web site of the Summit. A number of proposals for partnerships have been developed, and many more are still in the process of being developed.

Endnotes

- ¹ A listing of some selected partnerships is available in Annex K of the World Bank document (2001) "Making Sustainable Commitments: An Environment Strategy for the World Bank," at http://gefweb.org/Documents/Council_Documents/GEF_C17/C.17.Inf15.Annexes.pdf.
- ² The document entitled "Further Guidance" is a two-page addendum available at http://www.johannesburgsummit.org/html/documents/prepcom3docs/summary_partnerships_annex_050402.doc.
- ³ Different financing mechanisms, such as those related to regional development banks, the World Bank and the Global Environmental Facility, are potential sources of finance. In addition, an active role for commercial banks and investment companies is envisaged.
- ⁴ The Information Sheet is available at http://www.johannesburgsummit.org/html/sustainable_dev/partnerships2_form.doc.



Major Agreements on Energy and Their Objectives

Explicit global intergovernmental agreement-making on energy is recent. Based on a mandate of the Nineteenth Special Session of the General Assembly on the review and appraisal of the implementation of the Rio commitments in 1997, the Commission on Sustainable Development devoted its Ninth Session (CSD-9) to energy, transport and atmosphere issues. The outcome of its deliberations constitutes the global agreement on energy and sustainable development so far. A number of other major consensus documents or conventions, however, contain recommendations or provisions relevant for the 'energy for sustainable development' agenda. The non-exhaustive listing here attempts to provide the reader with a quick orientation and easy-to-use Web references for further investigation on what has already been agreed to by the international community.

In addition, there is the dynamic process of advancing international understanding and co-operation on energy for sustainable development that is pushed forward by the work of the secretariats and governing bodies of various UN system entities. A glimpse of this dynamic process is provided in the next chapter.

Progress on energy for sustainable development requires by its very nature a multistakeholder approach. The essential contributions of the private sector to the international energy agenda, which are not reflected in the listings below, warrant emphasis in this context.

The remainder of the chapter lists conferences or treaties that had energy as the major theme and then conferences on other subjects that—because of energy's linkages to and impact on many aspects of development—dealt with energy in one way or another.

Conferences with Energy as a Major Theme

Conference/Agreement: Commission on Sustainable Development, 9th Session

Date: April 2001

Main Focus: The objective of the CSD-9 was to promote energy as an engine for sustainable development. The major themes were energy, transport and atmosphere. The key issues identified were: accessibility of energy; energy efficiency; renewable energy; advanced fossil fuel technologies; nuclear energy technologies; rural energy; energy and transportation; technology transfer; capacity building; mobiliza-

tion of financial resources; and international and regional co-operation. In addition, in the lead-in to CSD-9, regional preparatory meetings were organized, including high-level official and ministerial meetings in Bali, yielding substantive and specific recommendations for the respective regions.

http://www.un.org/esa/sustdev/csd9/csd9_2001.htm

Conference/Agreement: Kyoto Protocol

Date: December 1997

Main Focus: The objective of the Kyoto Protocol is to limit emissions of certain greenhouse gases not controlled by the Montreal Protocol. Its main goals relevant to the sustainable development agenda are the enhancement of energy efficiency in relevant sectors of the national economy, increasing the use of new and renewable forms of energy and the protection and enhancement of sinks and reservoirs of greenhouse gases not controlled by the Montreal Protocol.

<http://unfccc.int/resource/docs/convkp/lepeng.html>

Conference/Agreement: World Solar Summit – UNESCO initiated

Date: September 1996

Main Focus: Promote the development and use of renewable energy to enhance economic and social development.

<http://www.unesco.org/science/wsp/background/wspinfo.htm>

Conference/Agreement: UN Framework Convention on Climate Change

Date: May 1992

Main Focus: Stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level 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.

<http://unfccc.int/resource/conv/index.html>



Conference/Agreement: United Nations Conference on Environment and Development

Date: June 1992

Main Focus: The major contribution of UNCED on energy and energy-related aspects, such as transport, is contained in Chapters 7, 9 and 14 of *Agenda 21*. One of its programme areas is promoting sustainable development through energy development and efficiency improvements in production and consumption. Its main objectives are to reduce adverse effects on the atmosphere from the energy sector by promoting policies or programmes, as appropriate, to increase the contribution of environmentally sound and cost-effective energy systems, particularly new and renewable ones, through less polluting and more efficient energy production, transmission, distribution and use.

<http://www.un.org/esa/sustdev/agenda21.htm>
<http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>

Conference/Agreement: UN Conference on New and Renewable Sources of Energy

Date: December 1981

Main Focus: Promoting the development and use of new and renewable sources of energy. The main outcome was the Nairobi Programme of Action.

<http://www.un.org/documents/ga/res/36/a36r193.htm>

Conferences with a Reference to Energy

Conference/Agreement: Third United Nations Conference on the Least Developed Countries

Date: May 2001

Main Focus: Assess the results of the *Programme of Action of LDC II* at the country level; review the implementation of international support measures; and consider the formulation and adoption of a further Programme of Action at national, regional and international levels. In addition, other major energy goals were to promote the development of renewable energies by putting in place enabling policies and to attract domestic and foreign investments to increase energy infrastructure by creating transparent frameworks of rules and regulations.

<http://www.unctad.org/conferencel>

Conference/Agreement: Millennium Declaration

Date: September 2000

Main Focus: One of the objectives of the Millennium Declaration is to halve, by 2015, the proportion of the world's people whose income is less than US\$1 a day. In order to do that, CSD-9 recognized that it is necessary to provide the world's poor with basic energy services.

<http://www.un.org/millennium/summit.htm>

Conference/Agreement: Special Session of the General Assembly to Review and Appraise the Implementation of Agenda 21

Date: June 1997

Main Focus: Recommend to promote international and national programmes for energy and material efficiency, and encourage the relevant bodies to adopt measures aimed at assisting developing countries in improving energy and material efficiency through the promotion of their endogenous capacity-building and economic development with enhanced and effective international support.

This Special Session mandated that CSD-9 should focus on energy for sustainable development.

<http://www.un.org/esa/earthsummit/>

Conference/Agreement: World Food Summit

Date: June 2002; November 1996

Main Focus: The 2002 Summit defined three challenges for sustainable energy solutions: energy for cooking, getting electricity to the rural poor, and getting sustainable energy to the urban poor. The 1996 Summit recognized the importance of energy in agricultural production, food preparation and consumption.

<http://www.fao.org/wfs/homepage.htm>

Conference/Agreement: United Nations Conference on Human Settlements HABITAT II

Date: June 1996

Main Focus: Promote sustainable use of energy; facilitate access to sustainable sources of energy; promote land use patterns that minimize transport demands, save energy and protect open and green spaces; and provide incentives to promote the use of clean production and energy.

<http://www.unhabitat.org/>



Conference/Agreement: Fourth World Conference on Women—The Beijing Conference Platform for Action

Date: September 1995

Main Focus: Support the development of women's equal access to affordable energy technologies, such as wind, solar, biomass and other renewable sources, through participatory needs assessments, energy planning and policy formulation at the local and national levels; ensure that women's priorities are considered in energy conservation and transport.

<http://www1.umn.edu/humanrts/instree/bejingmnu.htm>

Conference/Agreement: World Summit on Social Development

Date: March 1995

Main Focus: Improve the availability and accessibility of energy services at the local or community level, and encourage the use of renewable energy, based on local employment-intensive resources, in particular in rural areas.

<http://www.un.org/esa/socdev/wssd/>

Conference/Agreement: United Nations International Conference on Population and Development

Date: September 1994

Main Focus: Encourage governments to promote the development and implementation of effective environmental management strategies for urban agglomerations, giving special attention to environmentally sound energy and transport systems.

gopher://gopher.undp.org/11/ungophers/popin/icpd/conference

Conference/Agreement: United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification

Date: June 1994

Main Focus: Promote national action programmes that include development and efficient use of various energy sources, and provide appropriate training and technology in the use of alternative energy sources, especially renewable energy resources, aimed particularly at reducing dependence on wood for fuel.

<http://www.unccd.int/convention/text/convention.php>

Conference/Agreement: The Global Conference on Sustainable Development of Small Island Developing States

Date: May 1994

Main Focus: The conference focused on the promotion of the development and use of renewable sources of energy and the dissemination of sound and efficient energy technologies. These aspects were considered key for mitigating the adverse impacts of climate change; for improving catchment, production, conservation and delivery of freshwater, water treatment systems and desalination; and for mitigating heavy dependence on imported petroleum fuels and biomass.

<http://www.un.org/esa/sustdev/sidstbc.htm>



UN System Capacities in Energy

This chapter provides an overview of the UN System's involvement in energy for sustainable development issues and demonstrates the many perspectives taken by UN agencies in line with their respective core mandates. Given the multidimensional character of the 'energy for sustainable development' challenge, through this multi-agency work the UN System offers the potential for a holistic, multidisciplinary approach—with each agency bringing to the common effort its particular sectoral entry point and specialized set of knowledge, expertise and skills.

Under the integrating vision of the Millennium Declaration and through a series of co-ordination instruments—from the Chief Executives' Board and its subsidiary structures to national programming frameworks, such as Common Country Assessment and UN Development Assistance Frameworks—the UN ensures that the whole of its energy-related work is greater than the sum of its parts. Continuous progress on integration is envisaged in the Bali Plan of Implementation, which calls for “promoting cooperation between international and regional institutions and bodies dealing with different aspects of energy for sustainable development within their existing mandate, bearing in mind paragraph 46 (h) of Rio+5; strengthening, as appropriate, regional and national activities for the promotion of education and capacity building regarding energy for sustainable development”. The current work-in-progress on the interrelatedness of the WEHAB issues, which is intended to continue beyond Johannesburg, would be an avenue for further advancing cooperation within the UN family and with all relevant stakeholders.

This is an indicative list of the UN entities most active in the field of energy, their main focus areas and some of their key initiatives. Its purpose is to give WSSD participants an overview of the work of the UN family as a whole. It is not a comprehensive or authoritative listing of all UN system activities in energy. The information was gathered primarily from the Web sites of the organizations featured. Any omissions or errors were inadvertent and are sincerely regretted.

Food and Agriculture Organization (FAO)

<http://www.fao.org/WAICENT/FAOINFO/SUSTDEV/EGdirect/default.htm>

FAO assists countries in meeting their energy requirements in agriculture, forestry and fisheries, emphasizing the need to transition from biomass fuels and animal and human power to a more diversified resource base that includes renewable energies and a more modern use of biomass. FAO assists countries in strengthening their institutional and human

capacities to implement rural energy programmes and in implementing bioenergy programmes within the framework of the Kyoto Protocol.

FAO implements field projects aimed at increasing the supply of biofuel; reducing woodfuel consumption and increasing energy efficiency; promoting renewable energy applications; improving market and trade mechanisms; fostering gender equality; addressing health problems; and promoting bioenergy for combined heat and power.

Global Environment Facility (GEF)

http://www.gefweb.org/Projects/focal_areas/focal_areas.html

GEF is the leading funder of clean energy projects in developing countries. Since its creation as a pilot programme in 1991 as a partnership between UNDP, UNEP and the World Bank, it has provided more than US\$1 billion, primarily as grants, for more than 100 projects in over 50 countries. These projects have a total value in excess of US\$6 billion, reflecting the leveraging of additional resources.

As the financial mechanism of the UN Framework Convention on Climate Change, GEF funding for clean energy projects is based on policies and programme priorities defined by the Convention. Projects are developed and implemented by the World Bank, UNDP, UNEP, and the four regional development banks with the following objectives:

- removing barriers to the adoption of cost-effective energy conservation and renewable energy technologies,
- reducing the long-term costs of low greenhouse gas-emitting energy technologies and
- promoting use of less energy-intensive forms of transportation.

GEF projects effectively link the global interest in reducing greenhouse gas emissions with local interest in economic development, job creation and reduced air and water pollution.

International Atomic Energy Agency (IAEA)

<http://www.iaea.org/worldatom/>

IAEA assists its member states in building capabilities for analyzing energy-economic-environmental interactions; serves as a global focal point for nuclear co-operation; helps member states apply nuclear safety standards; and verifies through its inspection system that states comply with their



commitments to use nuclear material and facilities only for peaceful purposes. More specifically, the IAEA assists member states in:

- building capacity by developing energy-related analytical models and training local experts in their use;
- maintaining databases for energy/environment analysis and distributing technology-related, safety and environmental information;
- establishing safety standards for nuclear power plants and for the protection of human health;
- facilitating technology and knowledge transfer;
- providing basic analysis of energy-related international trends and issues; and
- developing indicators for sustainable energy.

United Nations Department of Economic and Social Affairs (UN/DESA)

<http://www.un.org/esa/sustdev/enr.htm>

Energy activities undertaken by DESA are guided by the decisions of the Committee on Energy and Natural Resources for Development, the Commission on Sustainable Development, ECOSOC, and the General Assembly on energy, environment and sustainable development. Activities are aimed at promoting the development and use of new and renewable sources of energy, efficiency of energy use, sustainable development in the transport sector and energy exploration and development in developing countries.

DESA provides technical support and consultancy services to develop national capacity for energy project evaluation and analysis of energy technologies. It also co-ordinates energy activities in the UN system with a view towards working for sustainable development goals within a common framework, eliminating duplication and overlap of work and supporting intergovernmental processes.

Recent analytical work in support of intergovernmental negotiations on energy by DESA has produced a comprehensive and balanced Secretariat report analyzing energy issues and options and suggestions for strategies and actions needed at national, regional and international levels; a guide to partnership mechanisms with energy goals, targets and milestones for the WSSD process; and, in collaboration with UNDP, the World Energy Assessment, an independent analysis of the world energy situation by a broad group of energy experts from academia, the research community, governments, industry and NGOs.

DESA's activities include:

- monitoring and analyzing global energy trends and new energy technologies;

- providing technical assistance, training, seminars, workshops, and study tours on energy exploration, renewable sources of energy, the environment-energy-transport interface, rationalizing energy end use, demand-side management, energy development, uses of hydro resources and environmental protection in energy production and use;
- undertaking studies aimed at increased understanding of the environmental and socio-economic impacts of policy options;
- demonstrating through some 20 pilot projects and advisory services the feasibility of new and renewable sources of energy in rural areas;
- mobilizing resources; and
- co-ordinating energy activities within the United Nations System.

United Nations Development Programme (UNDP)

<http://www.undp.org/seed/leap/index.html>

UNDP is the UN's development agency. It works with national counterparts on solutions to achieve the overarching goal of cutting poverty in half by 2015, one of the Millennium Development Goals. Access to energy services is essential to reducing poverty.

UNDP is present in 166 countries, helping to find solutions to this challenge and to attract and use aid effectively. Its energy activities world-wide help countries strengthen their capacity to achieve sustainable development, seeking out and sharing best practices, providing innovative policy advice and linking partners through pilot projects that help poor people build sustainable livelihoods. At the country level, UNDP supports activities that can achieve the multiple social, economic and environmental benefits of sustainable development. Activities focus on:

- strengthening national policy frameworks to support energy for poverty reduction and sustainable development;
- promoting rural energy services to support growth and equity;
- promoting clean energy technology for sustainable development; and
- increasing access to investment financing for sustainable energy.

UNDP is uniquely placed to build on its in-country presence and to provide integrated solutions to address complex poverty and equity issues related to the provision and use of energy services. The Common Country Assessments and the Country Cooperation Frameworks developed for each pro-



gramme country offer a single window for identifying integrated solutions to energy and development bottlenecks. In combination with its role as co-ordinator for the UN system, UNDP is able to identify strategic entry points to enhance policy frameworks by building capacity, assisting with grants and, on a technical basis, initiating demonstration projects.

UNDP has a well-defined presence in sustainable energy issues in developing countries and countries with economies in transition due to its role as a GEF Implementing Agency, as well as through its Thematic Trust Fund on Energy for Sustainable Development and its ability to co-ordinate funding for projects. UNDP is also the Implementing Agency for the GEF-funded Small Grants Programme, which provides grants of up to US\$50,000 for community-based climate change and related land degradation projects.

About 70 per cent of UNDP's country offices report working on sustainable energy, with the major areas of focus being energy efficiency, renewable energy and energy planning. From 1996 to 2000, UNDP was involved with more than 200 GEF and non-GEF energy projects, not including the GEF Small Grants Programme projects. Over the same period, co-funding (63 per cent) and the GEF (32 per cent) provided the principal sources of funding for the US\$663 million UNDP energy portfolio.

UNDP also works at the global level, providing advocacy and analysis for the development of energy-related policies that will ensure sustainable development and stress the central and critical role of energy in supporting the social and economic aspects of sustainable development in addition to the environmental aspects.

United Nations Environment Programme (UNEP)

<http://www.unep.org/themes/energy/>

UNEP's Energy Programme addresses the environmental consequences of energy production and use, ranging from global climate change to local air pollution. It is concerned with renewable energy, energy efficiency, transport, energy finance and policy issues.

The goal of the Programme is to insert a longer term, environmental dimension into energy sector decisions. Working with a wide range of partners, UNEP helps develop and implement approaches for analysing and evaluating the environmental dimensions of energy policies, climate change mitigation options, energy sector reform, industrial energy efficiency and transport. For example, UNEP helps developing countries factor the Clean Development Mechanism (CDM) created under the Kyoto Protocol into energy sector planning so that they can analyse how funds from CDM

investors might spur investment in clean energy. It also develops analytic tools that help decision-makers achieve practical solutions to energy problems. UNEP is also helping developing countries overcome transport-related problems like the phase-out of lead in gasoline and urban air pollution.

A special effort is made to help financial institutions better understand the investment opportunities available in renewable energy and energy efficiency, work that builds on UNEP's Finance Initiatives involving leading banks and insurance companies. Rural Energy Enterprise Development projects under way in eight countries in Africa, Asia and Latin America are helping bring business development support and early-stage financing to innovative new clean energy companies. This effort is supported by the United Nations Foundation.

One of UNEP's strengths in the energy field is its network of collaborating institutions, particularly the UNEP Collaborating Centre on Energy and Environment. This international group of scientists, engineers and economists provides technical and analytical support to UNEP and partners in developing countries. On environmental analysis and assessment, UNEP is assisting countries, with co-financing from the GEF, to carry out solar and wind resource assessments in pilot sites so as to determine the most suitable areas for renewable energy investment.

UNEP is often selected by countries and donors to execute regional projects that improve South-South transfer of technology, replication of success stories and regional co-operation. Building on a wide network of NGOs, government agencies and industrial associations, UNEP can delegate responsibility for large projects in a sustainable and country-driven manner.

UNESCO

<http://www.unesco.org/science/wsp/>

In the area of energy, UNESCO is engaged in the promotion of renewable, environment-friendly sources of energy. UNESCO was the initiator of the World Solar Programme 1996-2005, which promotes renewable energies like solar thermal and solar photovoltaic, wind, biomass, micro-hydro, tidal, ocean thermal, and geothermal. UNESCO advocates for renewable energy, capacity building, and the development of competent human resources; raises awareness about and promotes renewable energies; and provides policy advice. In particular, activities aim at implementing the Global Renewable Energy Education and Training (GREET) Programme with particular emphasis on Africa.



United Nations Industrial Development Organization (UNIDO)

<http://www.unido.org/doc/501750.htmls>

Energy and the environment are key thematic priorities in UNIDO's work programme. Implementation of international environmental agreements is an important area that includes assistance to developing and transition countries in meeting the requirements of the UN Framework Convention on Climate Change. UNIDO supports the convention's intergovernmental process with capacity building and technology needs assessments in Africa and Asia, and with evaluations of energy-efficient industrial technologies such as cogeneration.

Methodological work addressing baselines, additionality and the calculation of carbon emissions reductions from energy efficiency projects is undertaken in preparation for entry into force of the Kyoto Protocol.

UNIDO's energy-related technical assistance addresses both the supply side, through provision of energy for industry, and the demand side, by improving industrial energy end-use efficiency. Projects currently under way support a broad series of initiatives at the policy, institutional and enterprise levels to increase efficiency in power generation and end use of energy, and to provide a solid foundation for the widespread introduction of renewable energy technologies.

Through its rural energy initiatives, UNIDO promotes income-generating uses of energy for rural development and poverty alleviation. UNIDO's energy programmes cover capacity building related to renewable energy technology and the assembly and manufacture of equipment and structures in developing countries.

UNIDO works with the renewable source of energy (solar, mini-hydro, wind, biomass) most suitable to a given situation. An interesting application is the use of solar PV for information and communication technologies for rural areas, an approach particularly appropriate for sub-Saharan Africa and rural Asia.

UNIDO works to raise awareness of innovative ways of financing more efficient power-generating capacity through build-own-operate and build-own-transfer schemes. This particularly concerns hydropower projects in Latin America and coal plants in Asia. UNIDO has provided technical assistance to power authorities and industrial energy R&D centres, focusing on clean coal and coal bed methane technologies, improved access to gas supplies and modern refinery technologies.

To stimulate investment in renewable energy technologies, UNIDO disseminates information on the application of

mini-hydro, solar, wind and sustainable biomass. Work also focuses on technical assistance to improve industrial energy end-use efficiency. This includes institutional reforms to overcome technical, market and financial barriers to energy efficiency in energy-intensive industries.

UNIFEM

<http://www.unifem.org/>

UNIFEM promotes gender equality and women's social, economic and political empowerment. It works to ensure the participation of women in all levels of development planning and practice and acts as a catalyst within the UN system, supporting efforts that link the needs and concerns of women to all critical issues on the national, regional and global agendas. UNIFEM's work focuses on strengthening women's economic capacity as entrepreneurs and producers, increasing women's participation in the decision-making processes that shape their lives, and promoting women's human rights. Gender is a particularly important dimension of policies and programmes in energy for development, given poor women's central role in gathering sources of energy and using them at the household level.

World Bank

<http://www.worldbank.org/energy/>

The World Bank Group (WBG) approach focuses on four business lines in energy supply:

- helping the poor directly,
- improving macroeconomic and fiscal balances,
- promoting good governance and private-sector development and
- protecting the environment.

To realize the transition from traditional to modern energy use for poor households that goes hand-in-hand with efficient and environmentally sustainable supply and use of energy, greater choice of energy services for consumers, and macroeconomic and fiscal stability, the WBG implements these business lines in a variety of ways:

It works with clients and partners. For example, it supports the development of energy strategies for developing and transition economies within a comprehensive development framework ensuring that their poverty reduction strategies deal with energy issues.

It deploys its instruments selectively. For example, it combines financing with capacity building assistance and advice or knowledge transfer. Where country and project creditworthiness are sufficient, the International Finance Corporation can issue loans and equity, and the Multilateral Investment



Guarantee Agency can issue guarantees, to support private investments. If they are not sufficient, the International Bank for Reconstruction and Development or the International Development Association can issue partial risk guarantees with sovereign counter-guarantees to support private investments, particularly where the key risk of a project relates to concerns about government performance or policy reversal.

It forms partnerships with stakeholders. Besides governments, donors and utilities, this community includes non-governmental organizations, project developers and private investors in energy corporations.

It exploits its comparative advantages. The WBG's comparative advantages derive from its ability as a multilateral lender to offer a combination of financing instruments, access to decision-makers and a comprehensive view of economic and social development that derives from its experience working at the interface of poverty, macroeconomics, governance and the environment.

World Health Organization (WHO)

<http://www.who.int/about/who/>

Energy is key to sustainable development, and its impact on the environment and on poverty alleviation has great importance and relevance to WHO, the lead agency on health. Several key policy and strategy documents have guided, and continue to guide, WHO work in regard to energy-related activities. These include the renewed Health-for-All policy (HFA in the 21st Century) and *Agenda 21* (Chapter 6, for which WHO is task manager). WHO's work is conducted in collaboration with other agencies in the UN system, regional and international organizations, collaborating centres, research and academic institutions, non-governmental organizations and others.

The following are some examples of WHO activities related to energy use and services:

- assessing health impacts of development policies and projects and building capacity in health impact assessment;
- contributing to energy health risk assessment;
- monitoring and assessing linkages between development, health and environment impacts, incorporating an energy dimension;
- developing indicators and methodologies;
- promoting assessments of health impacts and intervention strategies related to various forms of household energy (with an emphasis on biomass burning), as well as capacity-building, awareness-raising and policy development;

- strengthening capacity in policy and planning for health;
- assessing air quality and health implications in urban areas;
- supporting programmes to protect the health of workers and communities by promoting clean energy and clean technologies, including in 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 the health impacts on end-users of services provided by energy.

World Meteorological Organization (WMO)

<http://www.wmo.ch/>

WMO is the authoritative scientific voice in matters relating to atmosphere, water and climate in the world arena. Weather and climate information are vital for developing renewable energy resources and for efficient use of energy. WMO promotes sustainable energy production and use in several programmes. Activities include:

- co-ordination of observations of weather, climate and water from thousands of locations daily;
- support for development of energy-related activities within the framework of the Intergovernmental Panel on Climate Change; and
- contribution to the development of methods for comparative assessment of environmental impacts of different energy sources.

Different forms of energy production, including hydropower, biomass energy, solar and wind energy, draw on resources that are more or less directly dependent on climate conditions. A major thrust in WMO programmes is the provision of guidance material and capacity building in the needs and requirements for services to the energy sector.

Regional Commissions

The Regional Commissions support a wide range of energy activities: technical co-operation, policy advice, research, analysis, data/statistics, exchange of best practices, meetings, regional integration and co-ordination, publications, networking and training. See links below for specific areas of intervention.

Economic Commission for Africa (ECA)

Fostering Sustainable Development

http://www.uneca.org/programmes_home.htm



Economic Commission for Europe (ECE)

Sustainable Energy

<http://www.unece.org/energy/nrg/home.html>

Transport, Environment, and Health

<http://www.unece.org/poja/>

Economic Commission for Latin America and the Caribbean (ECLAC)

Environment and Human Settlements

<http://www.eclac.org/dmaah/>

Natural Resources

<http://www.eclac.org/drni/>

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

Environment and Natural Resources

<http://www.unescap.org/enrd/>

Population, Rural and Urban Development

<http://www.unescap.org/pop/division.htm>

Economic and Social Commission for Western Asia (ESCWA)

Energy

<http://www.escwa.org.lb/divisions/environment/eis.html>

Environment Coordination

<http://www.escwa.org.lb/divisions/environment/ecu.html>

Natural Resources

<http://www.escwa.org.lb/divisions/environment/nrs.html>

