Internationale Konferenz
für Erneuerbare Energien, Bonn
International Conference
for Renewable Energies, Bonn

Version of 22 May 2004

Policy Recommendations for Renewable Energies

The document "Policy Recommendations for Renewable Energies" is presented to the International Conference for Renewable Energies for consideration and discussion at the Ministerial Roundtables, the Plenary Sessions, and the Multi-Stakeholder Dialogue.

The conference is invited to endorse the document, taking into account modifications that may emerge from deliberations at the conference.

This document has been elaborated taking into account numerous comments on earlier drafts from the International Steering Committee, governments, international institutions, agencies and programmes of the United Nations, international non-governmental organisations as well as industry and finance sector representatives, and comments submitted by the stakeholder representatives involved in the preparation of the Multi-Stakeholder Dialogue.

Contents

List of acronyms

APEC	Asia Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CSD	Commission on Sustainable Development
CSR	Corporate Social Responsibility
ECA	Export Credit Agencies
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH
IAEA	International Atomic Energy Agency
IEA	International Energy Agency
IFI	International Finance Institutions
IIIEE	International Institute of Industrial Environmental Economics
IPP	Independent Power Producer
JI	Joint Implementation
MERCOSUR	Mercado Común del Sur
NAFTA	North American Free Trade Agreement
NGO	Non-governmental organisation
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development
PoI	(Johannesburg) Plan of Implementation
PPP	Public Private Partnership
R&D	research and development
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
WEHAB	water, energy, health, agriculture, biodiversity
WHO	World Health Organization
WMO	World Meteorological Organization
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization

Introduction

The document "Policy Recommendations for Renewable Energies" is one of the key outcomes of the International Conference for Renewable Energies [to be confirmed by the conference], held 1 – 4 June, 2004, in Bonn, Germany. The document is based on the current understandings on policies and decision-making designed to promote renewable energies. It is based on experiences and lessons learnt from policies, programmes, projects and other initiatives in the public and private sectors worldwide.

The diversity of challenges, resource opportunities, as well as financing and market conditions among and within regions and countries implies that a pluralistic approach is required. Thus, the recommendations provide decision-makers with a menu of policy options based on available experience and knowledge.

In this spirit, the International Conference on Renewable Energies has endorsed the document [to be confirmed by the conference].

This document has been prepared by a drafting team that included Thomas B. Johansson (International Institute of Industrial Environmental Economics (IIIEE), Lund University, Sweden), Uwe R. Fritsche (Öko-Institut, Germany), Christopher Flavin and Janet Sawin (Worldwatch Institute, USA), and Dirk Aßmann and Tilman C. Herberg (Deutsche Gesellschaft für Technische Zusammenarbeit, GTZ, Germany) under the guidance of the Convenors of the Conference.

The drafting team has benefited from numerous comments on draft versions from the International Steering Committee, governments, international institutions, agencies and programmes of the United Nations, international non-governmental organisations as well as industry and finance sector representatives and other stakeholder representatives involved in the preparation of the multi-stakeholder dialogue. Finally, the recommendations reflect the contributions from the delegates to the conference, including the discussions in the Ministerial segment, the Parliamentary Forum and the multi-stakeholder dialogue.

I. Policy Background

The development and diffusion of renewable energy resources and technologies will help realize important economic, environmental and social objectives in the early decades of the 21st century. Renewable energies are a critical element for achieving sustainable development.

The World Summit on Sustainable Development (WSSD) 2002 agreed on a comprehensive agenda on energy for sustainable development. Guided by the overarching objectives of sustainable development and poverty alleviation, governments agreed to improve access to "reliable, affordable, economically viable, socially acceptable and environmentally sound energy services and resources", to increase the use of renewable energies, to enhance energy efficiency, and to provide cleaner liquid and gaseous fuels.

The renewables 2004 conference is part of the international response to these challenges. It is in the context of a broad and comprehensive agenda that policy recommendations are being offered to address the crucial element of renewable energies.

The benefits provided by renewables will differ among and within countries, depending on the local situation, options, and concerns. Among the benefits that can flow from increased use of renewable energy are: enhanced security of energy supply, reduced threat of climate change, stimulation of economic growth, jobs creation (often in rural areas), higher incomes, poverty reduction, improved social equity, and protection of the environment at all levels. Renewables can also improve access to energy services by providing reliable and affordable energy supply for people in rural and urban areas. Increased utilisation of renewable energy should be seen as a means to such ends, not as an objective *per se*.

With these benefits in mind, Member States of the United Nations agreed at the WSSD: "With a sense of urgency, substantially increase the global share of renewable energy sources with the objective of increasing its contribution to total energy supply".

Renewable energy flows are very large in comparison with commercial energy demand. Renewable energy can be increasingly important for providing many key energy services such as lighting, heating, cooling, safer and healthier cooking, mechanical power, transport, and communication. Technologies exist to tap the renewable energy flows at costs that are often competitive with conventional energy sources if the evaluation includes external costs and benefits, and subsidies to conventional energies are eliminated.

As developing countries work to expand and modernise their energy systems, and industrialised countries work to replace their ageing systems and meet rising demand, societies face a unique opportunity over the next few decades to increase investments in renewable energies. Over the next 30 years, global investments in energy-supply infrastructure are projected to be $16 trillion. The opportunity is to orient a large and increasing share of these investments towards renewable energy, in order to advance the transition to a global energy system for sustainable development. On the other hand, if these investments continue as business as usual, mostly in conventional energy, societies will be further locked into an energy system that is incompatible with sustainable development and that further increases the risks of climate change.

Due to effective renewables policies enacted in a few countries, global growth rates for some renewable energy technologies have exceeded 20 percent per year over the past decade. Such strong growth has rapidly driven down costs through learning, economies of scale, and technology improvements. These advances will be sustained and expanded only if the policies that underpin those growth rates are continued and adopted in many more countries. In fact, increasing the use of renewable energies is largely an issue of policy.

II. Policy Priorities for Renewable Energy

To adopt the policy changes and mobilise the capital that is required to achieve the full the potential of renewable energies, decision makers—in government, as well as the private sector, and civil society as a whole—must undertake the necessary actions to incorporate the goals of sustainable development into their policies. Three main priority areas for renewable energy policies are discussed below:

i. establishing policies for renewable energy markets;

ii. expanding financing options; and

iii. developing the capacity required.

These priority areas reflect the discussions at the International Conference for Renewable Energies. The challenges in these areas are described in Sections II.1 through II.3, and the actor-oriented policy options are provided in Sections III through V.

II.1 Establishing Policies for Renewable Energy Markets

A sustainable future can be achieved only if markets function effectively and efficiently. Thus, sound economic principles and policies are important. In the long term, it is essential to establish a level playing field in the energy market, free of subsidies, and to internalize external costs.

There are two major conditions that bias current markets against renewables:

i. subsidies to conventional energies and

ii. lack of accounting for external costs in market conditions, especially prices.

Globally, subsidies for conventional energies– estimated to exceed $200 billion annually– make it significantly more difficult for renewable energy to achieve higher market shares and attain the necessary economies of scale. External costs—including health, safety, security, and environmental—are typically much larger for conventional energies than for renewable energies, and the limited accounting of these costs in the market place works strongly against renewables. At the same time, renewables provide benefits that are not reflected in energy policies and market conditions, including increased employment, reduced import dependence, and reduced burdens on foreign exchange. The market place should be corrected to reflect the full costs and benefits or all energy options, a process often referred to as “levelling the playing field”.

In addition to levelling the playing field, a favourable climate for renewables is needed to overcome high initial costs and additional market distortions (such as lack of information, higher risk perception) and to mainstream renewables in the market place. While a few nations have started to address this road, most countries still lack the enabling policy framework required to advance renewable energies. Clear overall goals and targets for advancing the use of renewable energy help to create an environment that is conducive for long-term investments and to provide planning certainty for industrial stakeholders and consumers. Clear rules, roles and responsibilities must be defined at every stage in the supply chain that affects renewable energy to ensure that individual and institutional consumers receive the full benefit and improved level of services that renewable energy can provide. No single policy instrument is appropriate for every application, energy carrier, branch or sub-sector, or socio-political situation. Therefore, an appropriate and effective mix of policy instruments becomes essential. This is particularly crucial for new market entrants—such as many renewable energy technologies—to achieve the anticipated technology improvements and cost reductions that are possible via mass production and learning.

Institutional obstacles and existing policies can severely limit opportunities for investment in both grid-connected and off-grid renewable energy technologies. For example, in many

countries renewable energy development is subject to an institutional and legal patchwork, with many different and often contradictory laws, regulations, policies and administrative procedures.

Recent experience suggests that the need for effective and comprehensive regulations increases with restructuring, liberalisation and privatisation in the energy sector. Such regulations are particularly important to cushion economically vulnerable populations and to safeguard the environment from the negative impacts of market transformations.

The way in which energy is produced and used affects almost every sector of the economy and should be considered in all policy areas. New and coherent policies should be adopted in the relevant sectors. For example, building codes and standards could be designed to promote the integration of renewable energy in building designs and planning processes. Modern production and use of bioenergy would benefit from being incorporated into policies relating to land-use planning, agriculture, forestry, and waste treatment. The type and amount of fuels used for transportation—the fastest growing energy demand sector—can be strongly influenced by fuel policies, technology standards and urban planning. Policies that promote renewables also encourage industrial development and innovation, which in turn can accelerate renewable energy technology development and transfer.

Policies and regulations that support equal access for women to energy services, education, technology, and financial instruments are important for enabling them to make informed choices about energy.

Governance issues, including respect for property rights and contract enforcement, are also critical, in parallel with transparent and enforced national and international anti-corruption policies and regulations.

II.2 Expanding Financing Options for Renewable Energy

All renewable energies, with the exception of biomass, have zero fuel costs and low operating costs. At the same time, they do have relatively high up-front capital needs, so finance-related risks and barriers hinder renewable energy investments.

In level markets, the financial sector and private investments would be expected to provide the necessary finance for renewables. Special policies are needed to overcome the initial costs in the early stage of a technology. In addition, government polices are also required to ensure that many other factors are taken into account in competitive markets, such as the projected costs of climate change, the costs of fuel imports and fuel price volatility, and other environmental, social, economic and security impacts of various technology options. Full cost accounting for projects would incorporate such factors on a life-cycle basis, which would improve the attractiveness of investing in renewable energy projects.

In general, new technologies tend to be more expensive than mature technologies that have benefited from many years of learning, technology advancements and economies of scale. Thus, it is important to enact policies to reduce the costs of renewable energy through increasing cumulative investments in renewable energy technologies as well as investments in research and development (R&D).

The cost of generation and distribution (if needed) of renewable energy varies widely. Some mature technologies can already compete with fossil-fuel options; however, they all face problems such as high transaction costs and restricted access to capital. Innovative financing and contracting schemes can be instrumental in overcoming these barriers.

Various mechanisms exist to significantly reduce investor uncertainties and enable investors to recover higher incremental costs through (slightly) higher customer prices. The additional costs associated with renewable energy may be distributed among all or parts of the customer base. Such mechanisms include feed-in tariffs (pricing systems) and renewable portfolio standards (quota systems), which have already been enacted in many industrial[1] and

[1] For example Denmark, Germany, Spain, Sweden, and the United Kingdom.

some developing[2] countries.

In developing countries, in addition to domestic capital and some foreign direct investments, specialized funds—such as the Global Environment Facility (GEF)—encourage further investments in renewable technologies by covering the incremental costs of such projects. Certified Emission Reductions (CERs), which have derived from the Clean Development Mechanism (CDM), are another option for attracting international capital flows to developing countries.

Implementation of small-scale renewable energy projects—whether electricity, biogas or heat—requires specialised financial tools, vehicles and measures targeted to the specific project conditions. Several options, including dedicated funds, bundling of investments with services, and customer-based investments, have proved effective and deserve further promotion.

Emerging evidence in developing countries suggests that micro-credit linked to micro-enterprises, particularly those owned and operated by women, can have considerable success in both promoting renewable energy use and meeting poverty reduction goals. Consumer financing mechanisms to enhance consumers' ability to pay for renewable-generated energy services have been instrumental in many situations.

This calls for a more inclusive strategy that moves beyond the financing of stand-alone energy supply and towards integrated supply- and demand-side financing. Similar strategies to include renewables in non-energy sectors—such as water supply, sanitation, health, education and communication—can significantly enhance energy access. Overall, financing strategies for renewables should address the financing needs of both suppliers/vendors and different categories of end-user consumers in a balanced manner.

The introduction of modern renewable energies[3] in rural areas—where people rely largely on the traditional use of biomass and have limited purchasing power—should be linked to policies that promote rural development. Renewable energy can play an important role in rural income-generation activities that require process heat (e.g., low temperature water-heating for clothes-dying) and cooling (e.g., refrigerators for food preservation and storage of medicines/vaccines in health facilities). Here, national and international efforts are needed to create renewable energy markets where individual households, small businesses, and communities can play a role in local financing.

[2] For example Argentina, Brazil, China, Costa Rica, and Thailand.

[3] Particularly biomass converted to modern energy carriers such as biogas, other fuels or electricity.

II.3 Developing Capacities for Increased Use of Renewable Energies

In order to increase the use of renewables, strengthened capacity is particularly important in three main areas:

1. development of a well-trained workforce to manufacture, install, operate and maintain technology, business, and regulatory systems,
2. design of a coherent and functioning institutional framework, and
3. provision of available, appropriate, and affordable technologies.

Capacity development in all three areas is essential for the creation of viable renewable energy markets, and should be viewed in a broad sense.

Indigenous know-how and experiences, mainly in the case of dispersed rural populations in developing countries, should be carefully evaluated and incorporated into educational efforts, R&D, and technology transfer.

It is essential to increase public awareness of the benefits and applicability of renewables as a means to achieve sustainable development goals, including social and economic betterment through improved access to energy services.

Research and development (R&D) for advancing the renewable energy technologies, business models, and policies are necessary for determining the optimal applications for renewables in market environments and need to be significantly strengthened. Past development of demonstration projects through private and public cooperation has proved an effective means to move forward from R&D. The efficient cooperation of public and private research institutions and private businesses for both R&D and technology transfer is essential and can lead to significant progress.

R&D is also needed to address the social dimension of renewable energy. For instance, numerous cases of innovation and successful renewable energy projects involving women, entrepreneurs and end-users are available across the developing world. An important part of capacity development for renewable energy market transformations is to identify and disseminate specific “best practices,” while furthering R&D to replicate and scale-up such experiences.

Given the necessity to advance energy for sustainable development in order to reach the Millennium Development Goals, an increasing share of Official Development Assistance should be allocated to development of capacity to address issues related to energy for sustainable development.

III. The Role of National Governments

National governments and parliaments are responsible for the formulation of policies that support effective and efficient markets in general.

The objectives and principles for the development of renewables discussed above present a number of challenges. These challenges differ among and within countries depending on local conditions, options and concerns. Similarly, the approaches preferred will vary. In most situations in industrialised countries, in economies in transition, and in developing countries, the elements below are important in order to increase the role of renewables:

Develop an overall energy policy that emphasizes renewable energy and fulfils sustainability objectives: Promotion of renewable energy and the need to meet sustainable development objectives should be incorporated into each country's general energy framework, based on national renewable energy resource evaluations. The desire to advance renewable energies also needs to be reflected in the policies of many other sectors, including transportation, healthcare, agriculture, construction, and education. This needs to be done in broad co-operation and stakeholder participation.

Formulate clear goals and targets for renewables: Governments should formulate clear targets (incl. target dates), strategies, and implementation plans based on national renewable energy resource evaluations in all relevant sectors, and based on analysis of how increased use of renewables could help fulfil national sustainable development objectives.

Establish transparent market conditions that encourage investment: Market transparency is essential to ensure participation of the private sector and for successful markets in general. National markets, which are always framed by government policies, need transparent and clear price and/or tariff structures that reflect full costs through the entire costs of production. Further, because a high degree of stability and predictability is prerequisite for any business involvement, it is important to assess and, if necessary, modify the existing market framework to ensure maximum stability and certainty. All subsidies relevant to energy should be continually monitored and publicised.

- *Establish a level playing field:* The market place is biased against renewables as a result of long-standing subsidies to conventional energies and a lack of signals in the market place to incorporate external costs. These biases should be overcome through economic or regulatory means.

  Governments agreed at WSSD to review the situation and take appropriate corrective action through subsidy reductions or the provision of balancing subsidies to renewable energy. In addition, governments should examine and revise licensing procedures and import regulations to ensure that they are not biased against renewables, and should address the current lack of adequate technology standards. Such policies generally reflect the needs of the conventional energy system based on large-scale power plants, and monopolised grids, and thus often act as barriers to the greater development and use of renewable energy.

- *Address the high cost of new renewable energy technologies:* Temporary and gradually declining subsidies for renewables are essential to develop markets for these new technologies. Policy options include tax credits, grants or rebates, and long-term low-interest loans, combined with renewable electricity pricing or quota systems. In general, performance-based subsidies are preferable as they reward the desired outcome—production of energy from renewables to enhance sustainable development. However, investment-based subsidies can be more appropriate where technologies are still maturing and costs are high, and should be tied to technology standards. Subsidies should follow pre-established rules that are clear and transparent to all

parties, and provide strong incentives for cost minimisation.

- *Create temporary incentives:* Pricing and quota systems are the two main types of regulatory policies available to promote renewable energies in the market place. Under pricing laws, governments oblige electricity utilities to guarantee renewable energy producers fixed, minimum prices over a certain time period, often with declining tariffs to reflect expected cost reductions. With quota systems, governments set political targets—typically by mandating a minimum share of capacity or generation to come from renewables—and let the market determine prices through certificate markets and/or bidding systems. Quota systems can be used off-grid as well—for example, for the introduction of biofuels. The costs of both systems may be covered by additional charges to electricity consumers or by taxpayers. To date, for on-grid electricity, pricing systems have proved most successful in driving market growth and attracting finance. The experience with quota systems is more limited, with a tendency to create less predictable incentives from the investor's point of view. Quota systems might be more suitable in the longer term when renewables become more established and the playing field has been levelled.

Integrate renewable energy issues into non-energy sector policies and cross-sector issues: Policies enacted in a range of sectors affect national and international energy systems. Thus, in order to implement coherent and effective policies, it is necessary to integrate renewable energy related issues into non-energy sector policies and cross-sector issues. The most important policy areas for mainstreaming renewables are agriculture/forestry, transport, economic development, poverty alleviation, education, urban and land use planning (including solar architecture), and infrastructure development.

Increase public awareness of the potentials, costs, and benefits of renewables: Governments can support this through public awareness campaigns, formal education programs, and other measures.

Promote the development of human capacity for renewable energy development: Governments should revise educational agendas and redirect professional training to incorporate renewables. In both the production and consumption of energy, a shift towards a sustainable system requires targeted action directed at professionals and consumers. Educators in a wide range of disciplines in schools and colleges need enhanced knowledge of the cross-linkages between renewables and their particular subjects, ranging from healthcare, poverty alleviation and education, to architecture and construction. Higher academic and professional training institutions have key roles to play in bringing renewables into the mainstream by supplying appropriately-skilled professionals through re-tailored, or new, teaching programmes. Dedicated staff and professionals are needed to develop policies and programmes, plan projects, finance, regulate, manage, install and maintain future renewable energy systems. Equally important, knowledgeable operators, including women, are needed to acquire, operate and maintain decentralised systems at the household and community levels. Chambers of Crafts and Commerce, and local renewable energy promotion agencies should become strongly involved in training people in related businesses.

Develop enabling institutions: Strong public institutions at the national level are essential to set priorities, plan, and establish policy and regulatory agendas to encourage renewable energy markets. Joint policy-making and priority setting between energy ministries and rural development, health, education, water, environmental, and other ministries helps to advance the case for renewables. National agencies, including centres of excellence and research institutions, are needed to carry out country-specific research, data collection and analysis (including gender-disaggregation), training, education, and to provide technical support to respective ministries.

Additional Policy Options

Use government's power to set the agenda and guide the work of international organisations: The United Nations system, development banks, and regional organisations should all become strong actors in advancing the use of

renewable energy for sustainable development. Efforts and instruments to foster the use of renewable energies should include safeguards against market distortions, especially export subsidies and import duties.

Utilize the Kyoto Protocol mechanisms: The Protocol's mechanisms offer significant opportunities for advancing renewables. In the case of Joint implementation (JI) and the Clean Development Mechanism (CDM), renewable energy projects would also support the development objectives of participating countries.

Strengthen global cooperation on renewable energies: The WSSD agreements need to be monitored in the broader context of advancement towards sustainable development and fulfilment of the Millennium Development Goals. The CSD-process should place clear emphasis on the promotion of renewable energies. A regular exchange of information regarding programming experience, target setting and evaluations between different countries would support rapid progress and reduce the risk of mistakes.

Strengthen regional cooperation in the field of renewable energy: Experience proves that regional institutions and organisations (e.g. EU, the United Nations Regional Commissions, ASEAN, MERCOSUR) can provide important political leadership. They can show a common way forward and create economies of scope and scale by integrating markets for renewable energy technologies and related services, and facilitating technology transfer. National governments need to act as the main drivers of such developments.

Secure grid access for renewables: Power system regulations should guarantee grid access for renewable electricity under transparent conditions. Governments have the role of providing favourable conditions through the use of policies like pricing laws with feed-in tariffs or quota/green certificate markets. The cost of these systems may be distributed over electricity customers rather than taxpayers. Where politically feasible, higher rates paid by electricity consumers can also help to generate a revenue stream to support investment subsidies for the poor who lack access to energy services altogether. Governments need to enact transparent and efficient procedures for obtaining the permits necessary for grid-access, as such procedures are important for investors.

Support renewable energy technologies for heating and cooling purposes: Heating and cooling are often neglected in energy policies, but they represent a large share of energy consumption in most countries. Increased use of renewable energies in buildings offers significant economic potential. Appropriate regulations such as building codes and energy-related standards can re-enforce financial support measures to accelerate the integration of renewable energy technologies in the construction sector.

There is also a need for comprehensive policies and measures that address heating and cooling services in existing buildings—in private houses (e.g. passive solar space heating and solar water heating), in the government and service sectors, and in industry as well. Renewable energy can play an equally important role in rural income-generation activities that require process heating (e.g., low temperature water-heating for clothes-dying) and cooling (e.g., refrigerators for food preservation and storage of medicines/vaccines in health facilities).

Policy Options Related Primarily to Industrialised Countries and Economies in Transition

Increase funding for renewable energy R&D: IEA member governments allocate only 8 percent of their energy research and development funding to renewable energies. Here governments have an opportunity to strengthen renewable energies by reversing the ratio of funds allocated for renewables versus those provided for conventional energy R&D. Demonstration projects in cooperation with the private sector should be encouraged as well.

Focus bilateral and multilateral development assistance (ODA) on catalytic funding of renewable energy programmes: Capacity building and catalytic financial leverage to extend energy services from renewable energy sources are key priorities. They should be provided in parallel with the creation and extension of micro-finance schemes that target consumers and small-scale businesses. Governments must take care to encourage, rather than undermine, the development of markets through the use of such subsidies,

particularly with regard to renewable energy technology exports to developing countries. Public-private partnerships are a successful means for developing such markets and should be further expanded.

Promote renewables through Export Credit Agencies (ECA): The public promotion of exports through the provision of credits or guarantees by ECAs can help mobilise private financing for renewables. ECAs should become more active in building industry awareness about renewable energy investment opportunities. Specifically, it is essential to establish standardised and simplified procedures for small-scale projects so as to reduce transaction costs. It is also essential to encourage long-term contract durations for renewables (e.g. at least 15 years) and more flexible modalities (e.g., flexibility in repayment terms; liberal treatment of local costs—for example, a higher share than currently allowed under the OECD-Arrangement) to adjust to the variety of renewable energy projects.

Utilise the power of public procurement: In most countries, the national government is the largest single energy consumer and should use its position to advance renewables by creating guaranteed demand for renewable energy and technologies over a given period of time. Large-scale and long-term government purchases of renewable energy and technologies would help provide stability and certainty in the marketplace, attract investors, set an example, and increase awareness about renewable energy, while also reducing perceived risks for investors.

Policy options related primarily to developing countries

Provide access to cleaner cooking fuels: Biomass resources can be used through modern conversion technologies to provide cleaner and higher value-added fuels to support both cooking and industrial processes. The impact of implementing improved biomass technologies and biofuels is particularly important for women. Such technologies and fuels can reduce the negative social and health impacts of cooking, and can expand the economic opportunities in women's heat-intensive micro-enterprises.

Provide access to electricity: The electrification of rural areas in industrialised countries was made possible through government support and cross-subsidies among electricity customers. Similar approaches deserve consideration in developing countries, where rural electrification remains a major challenge. Some recent models for grid extension and for installation of decentralised renewable power projects are based on public-private partnership approaches. Promising approaches are emerging that support rural entrepreneurs with a range of services—including training, marketing, feasibility studies, business planning, management, financing, and linkages to banks and community organisations—as means to expand access to energy services with renewable energy.

Make use of new financing tools: To attract private sector capital to renewable projects, governments should extend public-private partnerships, and develop and use micro-credit schemes. They should also encourage the creation of financial tools targeted to third-party and customer financing for off-grid renewables, and support insurance schemes for all renewable energy investments. In addition, access to and use of funds for renewable energies through carbon financing should be strengthened. Micro-credit lending can also be an effective tool for supporting investors in establishing renewable energy and service delivery systems, and can expand consumer access to both grid and non-grid connected renewable electricity.

IV. The Role of Intergovernmental Organisations

Intergovernmental organisations can recommend policies to national governments and can provide support for renewables on a regional and global scale. In general, their functions should be to focus multilateral policies and activities to significantly strengthen the role of renewable energy and to enhance cooperation among all players, including the private sector. Such a focus must promote those renewable energy options that best fulfil the needs of the end-users in a cost-effective, socio-economically equitable, and environmentally sustainable manner.

The United Nations system should define clear responsibilities for work on renewables: Various United Nations bodies, including FAO, IAEA, UNDP, UNDESA, UNEP, UNESCO, UNFCCC, UNIDO, WHO, and WMO, deal with renewables by offering advice and developing capacity. Here, the pooling of information and financial support must be better coordinated. Proposals to create a UN Energy body to facilitate coordination among UN entities working on energy should explicitly address the role of renewable energy in international assistance. Further, the UN Resident Coordinator system should specifically address the role of renewable energy in meeting development objectives in all sectors that receive UN system support at the country level.

The WTO rules should promote renewables: This refers to international trade in renewable energy as instruments for sustainable development— for example, bioenergy/biofuels, renewable energy technologies, and trade in green certificates among those electricity markets where significant targets have been set to expand the use of renewables. Governments, the WTO, and regional organisations like NAFTA, EU, and ASEAN should proceed rapidly to reduce trade barriers for renewable energy technologies as well as electricity and fuels from renewable sources. However, recognising that a key motivation for developing and industrialised countries to expand the use of renewable energy technologies is to reduce their import dependence (primarily fossil fuels), the removal of barriers to renewable energy should be accompanied by concrete measures for rapid technology transfer so as to reduce dependence on foreign technology. Negotiations on a multilateral energy subsidisation agreement could also help to level the playing field.

Include funding to renewables projects in development cooperation programmes: Renewables should receive funding through programmes that address poverty alleviation, rural development, education, healthcare, agriculture, water supply, sanitation, transport, and construction (passive solar heating and cooling, etc.).

Increase leverage for renewables investment through International Finance Institutions (IFI) lending: IFIs like the World Bank and the regional developing banks should encourage renewable energy investments in developing countries and in economies in transition. IFIs should strengthen their expertise and continue expanding their investments in renewables.

- *Establish clear objectives for renewable energy:* Given the huge investment needs and the leverage of IFI policies, IFIs should establish clear objectives and assign renewables a more prominent role in their strategies and portfolios, thereby sending strong signals to the private sector. Grants and loans for renewables leveraged through IFI investments would attract private sector financing, for example in PPP schemes. IFIs should also include renewables in existing programmes to alleviate poverty, targeting the rural poor in particular. In addition, IFIs should give more attention to the potential role and scope of micro-credits needs.
- *Provide dedicated funds to increase investment in renewable energy:* Funds with stable and adequate allocations should be established in the World Bank and Regional Development Banks to support renewable energy investments in developing countries and in economies in transition, and also to foster technological development, thereby contributing to the reduction of costs associated with

renewables in these countries.

- *Apply full cost accounting for IFI lending:* The evaluation of energy projects to be financed by IFIs should incorporate factors such as the projected costs of climate change and other environmental, social, economic and security impacts of various technology options, on a life-cycle basis.

Increase transparency of and reporting on renewable energy activities: IFIs and ECAs should fully disclose information regarding their financing, lending, insurance, and other relevant policies and contributions for renewable energy, as well as the role of PPP schemes. This would provide strong incentives for others to follow.

Strengthen the Global Environment Facility's portfolio: The GEF has a strong portfolio of renewable energy projects that should be further strengthened and expanded to include the modernisation of biomass, cooking in rural areas, grid access, and off-grid renewables for rural electrification.

Emphasise leadership role of regional organisations: The European Union, ASEAN, APEC, the United Nations Regional Commissions, MERCOSUR, IEA, and others should continue and expand their efforts to implement renewables projects, and to create supportive schemes among countries. Regional development funds should favour projects that promote and develop infrastructure for renewables, and that produce and use renewable energies—including a small number of large-scale demonstration projects—in order to provide strategic leverage for the transformation of energy systems.

Strengthen and enhance the cooperation for renewable energy development: International bodies and regional organisations should strengthen and enhance cooperation through, *inter alia,* policy and technology research and development (e.g. on rural electrification and modern biomass); technology transfer (North-South, South-South etc.), including public procurement of key technologies; and education, awareness raising, and professional training, including Masters and Ph.D. programmes on energy for sustainable development.

Strengthen institutional arrangements at the international level: Institutional capacity is needed to address key functions for promoting renewable energies, including:

- advocacy for renewables in general, as an instrument for sustainable development,
- coordination of monitoring and reporting on renewable energy developments by country, region, resource/technology, and policy experiences,
- provision of services such as advising, capacity building, pooling of information, analysis and coordination,
- establishment of common standards; and networking in coordination with other stakeholders, especially the private sector and women's networks.

V. The Role of Local Authorities, Private Sector, Civil Society and Other Stakeholders

V.1 Local Authorities

Although national governments will determine national legal frameworks, the implementation of renewable energies takes place at the local level. In light of the options and possibilities of local efforts, governments participating in Rio 1992 put special emphasis on the Local Agenda 21.

Establish local building codes: The formulation of appropriate building regulations and codes can help to accelerate the uptake of renewable energy in buildings. Those codes can be used for the promotion of various types of renewable energies based on local conditions (e.g., passive heating/cooling, solar thermal energy on the roofs of buildings, or district heating systems in which at least a portion of the fuel is biogas). Local authorities should develop their own strategies, taking into account full life-cycle costs (including externalities), and communicate their experiences to others.

Strengthen stakeholder involvement in licensing, and prioritise siting: Local planning and licensing authorities should foster stakeholder and community involvement in renewable energy projects, thereby reducing conflicts and difficulties concerning permission procedures, and reducing licensing duration. Developers of renewable energy projects should engage in active consultation and discussion with local communities at an early stage in the planning process. Local renewable energy zoning and siting plans should be developed as they would provide greater certainty for potential investors, and guide developers to areas where projects are more likely to be permitted.

Increase awareness and capacities: In the field of awareness and capacity building, local authorities play a crucial role as they are very close to the general public, institutions and enterprises. Public campaigns can support the enabling environment for investments in renewable energies and can clarify renewables' societal, environmental and economic benefits, as well as their benefits for local business. Joint efforts like public-private partnerships help to create markets for renewable energy and to build the necessary capacities. Furthermore, the creation of local centres of competence and independent advisory institutions can often provide the seeds for broader market development. There are several other opportunities to achieve similar goals that depend largely on local conditions–therefore, each local authority needs to formulate and implement its own approach.

Utilise the power of public procurement: Local authorities often have the power to create market demand for renewable energy through various local policies and measures. One option is to procure renewable energies through comprehensive purchases of, for example, renewable electricity and thermal collectors.

Establish public-private investment funds: On the local level, governments should establish public and private investment funds for renewables that directly benefit local people and businesses. A combination of such funds for PPP-schemes should be considered as well.

Address energy issues in other areas of local action: Although situations can vary significantly from one community to the next, there are always possibilities for influencing local energy developments, e.g., through local utilities, transport enterprises, waste policies, water and sanitation, or agriculture and forestry. Development plans should adopt policies that are designed to promote and encourage, rather than restrict, the use of renewable energy resources. The energy nexus should be seen in a broader sense.

V.2 Business and Private Sector

As governments recognize and address the challenges of developing effective policies that create and support market development for renewables, the private sector—from small local entrepreneurs to multinational corporations—will have to respond, in turn, by participating in schemes to increase renewable energy investments, and by increasing market demand for renewable energies. Business leaders have a responsibility to the local, national and global communities, and an increasing number of corporations and firms are acting pro-actively to meet that challenge. Two elements are important for the whole sector:

Incorporate corporate social responsibility (CSR) into business: The business community should help accelerate market introduction of renewable energy under the broader principle of CSR. For the private sector in general, CSR should become a core principle of business, with special emphasis on transparent reporting mechanisms with regard to social and environmental issues. The share of renewables in energy generation and/or consumption should be included in such reporting, as proposed by the Global Reporting Initiative.

Facilitate intra-firm technology transfer in renewable energy solutions: Multinational corporations, private or semi-private utilities, and internationally cooperating small and medium-sized enterprises are important vehicles for international technology transfer, and should consider enhancing their activities for the transfer of renewables-related knowledge and skills to other actors as an element of their CSR agenda. In this context, trade unions should play an important role in such activities as well. Renewable energy technology transfer needs to be recognised not only as a challenge, but also as an opportunity for market development.

Specifically with regard to renewables, private sector policies are of special importance in three sectors:

i. energy producers and traders (e.g. energy companies, utilities),

ii. finance and insurance (e.g. banks, rating firms), and

iii. energy customers/consumers.

Energy producer/traders, and manufacturers

Pursue the development of renewables: All energy suppliers, including but not limited to the oil and gas industries, should follow examples of international industry leaders to actively pursue the development of renewables as a part of their investment and marketing schemes. Companies already involved in renewable energy should shift more investments from exploration and production of conventional fuels to renewables. Those that have not yet entered the renewables market should consider doing so. “Downstream” firms in the refinery and retail business of transport fuels should begin blending their products with biomass fuels.

Commit publicly to “green” energy: Electricity and gas utilities, as well as independent power producers (IPP), have begun to commit to generating and/or purchasing “green power” from renewables, with some concentrating on new markets where customers request certified renewable products. In addition, some district heating companies (e.g., in Scandinavia) have increased the share of biomass in their products, and similar developments have begun for green biogas—sold through distribution networks and as a transport fuel. These pioneers demonstrate that renewable energy can be marketed successfully, and that renewable power offers growing business opportunities. The use of renewables also provides companies with more diversified portfolios, reducing their risk in the event of fuel price fluctuations, and avoiding potential future taxes or regulations associated with conventional energy and/or greenhouse gas emissions. All utility companies should consider making a commitment to generating and purchasing energy with renewable sources.

Join forces to help create incentives for renewables: Renewable technology manufacturers should work together to promote renewable energy in general, through increased marketing efforts, and to encourage strong and consistent government policies to advance renewables through market creation.

Invest in renewable energy as a key industry strategy: Energy suppliers should recognize the

economic benefits of advancing renewable energy. As markets develop around the world, those that are in the forefront of investing in and developing these technologies will be in strong positions to reap the economic rewards of a rapidly growing sector.

Finance and insurance

Treat renewable energy investments fairly: Insurance companies should provide coverage for renewable energy projects at fair and competitive rates, recognizing the risks of conventional energy, including the rising costs that many insurers will face as impacts of global climate change become more pervasive.

Provide finance for renewable energy investments: Banks should consider working with governments to provide low-interest, guaranteed loans for renewable energy projects. Low-cost capital is essential for addressing the barrier of high up-front capital costs, and availability of reasonable financing can increase investment in renewable energy considerably, helping to realise economies of scale while encouraging local investments in related infrastructure and training.

Offer risk-hedging financing tools for investments in renewables: Insurers and banks should develop and offer specialized instruments to minimize the various financial risks associated with investments in renewables, e.g., through bundling and aggregation of projects among technologies, regions, and countries. Cooperation with IFIs and ECAs could help to initiate/advance the application of such tools.

Pay increased attention to special conditions in developing countries: Particularly in developing countries, it would be helpful to establish flexible repayment schemes—for example, tying payments to borrowers' income streams. Micro-finance is important for enabling local communities to invest in renewable energy technologies, e.g., to modernize the use of biomass, and generate higher incomes.

Commercial and industrial energy consumers

Recognize the range of benefits of using and marketing "green" energy: In general, businesses seek low energy costs, and the benefits associated with purchasing green energy are not fully recognized. However, some firms—particularly those working in tourism, services, and retail—have become pioneers, actively purchasing renewable energy to meet their own needs, and marketing renewables to their customers. Such actions both improve customer relations and increase the competitiveness of green power. Many businesses have also installed their own renewable energy systems—atop commercial buildings, for example—to meet their energy needs. More businesses should consider this option as well.

V.3 Civil Society

Use the power of consumers to develop and expand markets: private consumers have great power in the marketplace, and could be encouraged to send signals in terms of preferences for energy from renewables. In order to encourage consumers to demand renewable instead of conventional energy, it is necessary to provide them with relevant information that is neutral and, where possible, free of commercial interests—for example, via labels and advice about best-practice examples for renewable energy technologies. This requires creating institutional structures for consumer information and advice.

Strengthen civil society's role in decision-making on sustainable energy solutions: The transition to renewables also requires greater involvement of general civil society in decision-making regarding future energy systems. Civil society group—from professional groups to unions and scientific organisations—have a wide variety of roles to play and skills to offer in the areas of policy formulation and project development and ownership.

Make use of the potential of non-governmental organisations (NGO): NGOs can fulfil the key function of providing information to particular stakeholder groups, can raise awareness and stimulate public debate, and can act as political pressure groups. Especially in developing countries, NGOs are often key to implementing

renewable energy systems; because they have such a strong presence on the ground, the role of NGOs in disseminating, installing and maintaining decentralised renewable energies should be strengthened. In addition, experience in other sectors shows that NGOs can be important intermediaries in the establishment of micro-credit schemes for rural consumers in developing countries. Their potential in this regard should also be harnessed to find financial solutions that can satisfy the energy needs of rural energy consumers.

Increase awareness through the mass media: The mass media can be important players in communicating the benefits of renewables to the public and, thereby, raising general awareness and acceptance. Some examples of popular but educative TV and radio programmes about sustainable energy issues already exist, in both developing and industrialised countries. These efforts should be increased and expanded into more markets and across more geographic areas, and using more communications channels. Media channels can be powerful and effective vehicles for increasing awareness of renewables, provided that the technologies they promote are consistent with women's practical (household), productive (income-generation), and strategic (social empowerment) needs.

V.4 Research and Education

Universities and other research institutions have key roles to play in advancing renewables research and education.

Focus curricula on new challenges: Curricula in all areas of study need to be reviewed with respect to energy for sustainable development issues. Masters and Ph.D. programmes are needed to bring forward the skilled people needed for the design, construction, and operation of renewable energy systems. These programmes must cover technology, business, and policy issues.

Strengthen renewable energy research: Research to support renewable energy development is needed in natural science, engineering, economics, health, law, social sciences, and other areas. Efforts are justified to foster multi-disciplinary programmes.