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SUMMARY OF THE UNFCCC/UNDP EXPERT MEETING ON METHODOLOGIES FOR TECHNOLOGY NEEDS ASSESSMENTS: 23-25 APRIL 2002

The Expert Meeting on Methodologies for Technology Needs Assessments was held from 23-25 April 2002, at the office of the Korea Energy Management Corporation (KEMCO) in Yongin, Republic of Korea. The meeting was organized by the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Development Programme (UNDP) and hosted by the Government of the Republic of Korea. Approximately 60 representatives of governments, United Nations agencies and other intergovernmental and international organizations attended the meeting.

The objective of the Expert Meeting was to identify and provide technical advice on the methodologies and tools needed to undertake technology needs assessments. During the workshop, participants met in plenary sessions to: hear an overview of the issue and country case studies; identify the elements of needs assessments; consider activities and initiatives on technology transfer; and examine possible post-needs assessment activities. Participants also convened in working groups to develop recommendations on methodologies and tools for assessing technology needs, as well as on the types of assistance required to carry out such assessments.

The findings of the workshop will be reported by the Chair of the UNFCCC Subsidiary Body for Scientific and Technological Advice (SBSTA) to the SBSTA at its sixteenth session in June 2002.

A BRIEF HISTORY OF THE UNFCCC AND TECHNOLOGY TRANSFER

Climate change is considered one of the most serious threats to the sustainability of the world's environment, human health and well-being, and the global economy. Mainstream scientists agree that the Earth's climate is being affected by the build-up of greenhouse gases, such as carbon dioxide, caused by human activities. A majority of scientists believe that prompt precautionary action is necessary.

UNFCCC: The international political response to climate change took shape with the development of the United Nations Framework Convention on Climate Change (UNFCCC). Adopted in 1992, the UNFCCC sets out a framework for action aimed at stabilizing atmospheric concentrations of greenhouse gases at a level that would prevent human-induced actions from leading to "dangerous interference" with the climate system. The UNFCCC entered into force on 21 March 1994. It now has 186 Parties.

TECHNOLOGY TRANSFER: Technology transfer is considered a key element in combating climate change under the UNFCCC. Technology transfer activities have been on the agenda of every session of the SBSTA and Conference of the Parties (COP). UNFCCC Article 4.5, which addresses the need for technology transfer, states that "developed country Parties…shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention," adding that "in this process, the developed country Parties shall support the development and enhancement of endogenous capacities and technologies of developing country Parties."

IN THIS ISSUE

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TECHNOLOGY NEEDS ASSESSMENTS: Parties addressed the issue of assessing technology needs at COP-4, held in Buenos Aires in 1998. COP-4 adopted a decision urging non-Annex I Parties (developing countries), in light of their social and economic conditions, to submit their prioritized technology needs, especially those relating to key technologies, to address climate change in particular sectors of their economies (FCCC/CP/1998/16/Add1). Recognizing the limited resources of non-Annex I Parties, the COP directed the Global Environment Facility (GEF) to provide funding to developing countries to identify and submit to the COP their prioritized technology needs (decision 2/CP.4).

There are currently 51 countries that are in the process of assessing their technology needs under the GEF through UNDP and UNEP. However, the lack of standardized guidelines for needs assessments presents a challenge to countries implementing these assessments. Addressing this issue, Parties at COP-7, in Marrakesh in November 2001, adopted a framework for meaningful and effective actions to enhance the implementation of UNFCCC Article 4.5 (decision 4/CP.7). In this context, the COP also requested the Chair of the SBSTA, assisted by the Secretariat, to organize a meeting with representatives from governments, experts drawn from the UNFCCC roster of experts, and representatives from relevant international organizations, to identify methodologies needed to undertake technology needs assessments and to report its findings to the SBSTA at its 16th session in June 2002 (FCCC/CP/2001/13/Add.1).

Editor's Note: *A preparatory meeting of the newly-established UNFCCC Expert Group on Technology Transfer (EGTT) was held on 22 April 2002, also in Yongin, Republic of Korea, immediately prior to the Expert Meeting. At this closed meeting, delegates began the Group's activities by electing its officers and exchanging views on possible elements for a programme of work. A Briefing Note on this meeting is available online at: http://www.iisd.ca/climate/egtt/*

REPORT OF THE WORKSHOP

SESSION ONE: OPENING SESSION

The UNFCCC/UNDP Expert Meeting on Methodologies for Technology Needs Assessments opened on Tuesday morning, 23 April. The event was chaired by SBSTA Chair Halldor Thorgeirsson, who welcomed participants, underlining that this gathering provided an important opportunity for advancing implementation of the provisions of the UNFCCC relating to technology transfer.

Kim Dong Won, Deputy Minister for the Republic of Korea's Ministry of Commerce, Industry and Energy, highlighted the importance of technology transfer in addressing the global challenge of climate change. He informed participants that his country had recently implemented its first three-year plan, and had just embarked on its second three-year plan, which includes several measures for developing appropriate technologies and encouraging private sector participation. He said the Republic of Korea planned to play a bridging role between developed and developing countries in promoting technology transfer.

Janos Pasztor, Coordinator of the UNFCCC's Sustainable Development Programme, welcomed participants, noting that the Republic of Korea – which has made a dramatic economic and industrial transition in recent decades – provided a "perfect backdrop" to a meeting on technology transfer. He drew attention to the COP-7 decision on this issue (decision 4/CP.7), which established a framework for technology transfer. Highlighting that this meeting was a direct outcome of the COP-7 decision, he welcomed the UNFCCC-UNDP cooperation in organizing this event. On arrangements within the UNFCCC, he drew attention to the establishment of a new Programme on Sustainable Development, noting that the issue of technology transfer, which was formerly dealt with under the Science and Technology Programme, would now be addressed under this new Programme. He thanked the Government of the Republic of Korea for hosting this meeting, and KEMCO for providing its facilities.

SESSION TWO: OVERVIEW AND COUNTRY CASE STUDIES

This session, which aimed to provide an overview of the technology transfer issue and some country case studies, took place on Tuesday morning, 23 April. The session began with a briefing on technology transfer in the context of the UNFCCC that outlined the meeting's objectives and presented an overview of the technology transfer programme. Participants then heard presentations and engaged in discussions on a working paper exploring tools and methodologies in assessing technology needs, and concluded the session by considering case study presentations identifying country approaches and challenges in needs assessments.

PRESENTATION ON TECHNOLOGY TRANSFER IN THE CONTEXT OF THE CLIMATE CHANGE CONVENTION: Wanna Tanunchaiwatana, Manager, Technology, UNFCCC Secretariat, introduced the issue of technology transfer in the context of the UNFCCC, outlined the meeting's objectives, and provided an overview of the meeting's agenda. On relevant provisions of the Convention, she highlighted Articles 4.5 and 4.7, noting that Article 4.5 establishes the need for technology transfer between developed and developing countries, while Article 4.7 stresses that the Convention cannot be adequately implemented by developing countries without financial assistance and technology transfer from developed countries. She observed that the Marrakesh Accords agreed to at COP-7 set the stage for developing a framework for technology transfer (decision 4/CP.7), and that the newly-established Expert Group on Technology Transfer (EGTT) has a significant role to play in implementing the framework.

She outlined the goals of this meeting, which include: providing the SBSTA with technical advice on available tools and methodologies; identifying the different barriers and means to overcome these barriers; discussing the processes and main elements of technology needs assessments; recommending to SBSTA tools, methodologies and processes in assessing technology needs; and describing potential follow-up activities that may be pursued by the different stakeholders. She concluded by drawing attention to the meeting's expected outcomes, which include: compilation of technical papers for reference by the SBSTA and other interested Parties; identification of tools, methodologies and processes; and identification of possible follow-up activities/actions of the different stakeholders after the process of identifying technological needs is complete.

PRESENTATION OF THE WORKING PAPER: EXPLORING TOOLS AND METHODOLOGIES IN ASSESSING TECHNOLOGY NEEDS: Zou Ji, UNFCCC Consultant, and Yolando Velasco, Programme Officer, Technology, UNFCCC Secretariat, jointly presented a working paper on *Exploring Tools and Methodologies in Assessing Technology Needs.* The working paper provides an overview of the concepts of technology needs assessments and methodologies used by different institutions, and discusses various methodological options for assessing technology needs in support of UNFCCC Article 4.5. Yolando Velasco defined technology needs assessment as "a set of country-driven activities that identify and determine the mitigation and adaptation tech-

nology priorities, involving different stakeholders in a consultative process to identify the barriers and measures to address these barriers through sectoral analyses."

On the process of technology needs assessment, Zou Ji highlighted three models: the Climate Technology Initiative (CTI) model, the UNEP model, and the UN Commission on Sustainable Development (CSD) model. While the models differ in their details, Zou Ji observed that in general they all stress the importance of stakeholder input and a well-defined implementation stage. He suggested that, based on the analysis of the three models, a general process of technology needs assessment can be elaborated, which involves:

- establishing criteria for evaluation of each technology by integrating core social and economic goals;
- identifying different technology options;
- describing the characteristics of different technologies and evaluating them with the above criteria;
- ascertaining the opinions of different stakeholders on technology preferences and synthesizing these opinions;
- ranking/prioritizing technology needs;
- summarizing and reporting the results of assessment; and
- setting-up a link with follow-up activities, such as design, execution and action plan.

Barriers to this process include, *inter alia*, difficulties in identifying the right stakeholders and experts, a low level of awareness about the climate change problem, and the challenge of keeping the list of candidate technologies updated.

DISCUSSANTS: Following these presentations, Chair Thorgeirsson invited two discussants, Rawleston Moore (Barbados) and Jørgen Fenhann (UNEP-Risoe), to comment on the working paper. Rawleston Moore said the paper made it clear that no one methodology would fit the unique circumstances of all countries. He highlighted concerns about how to overcome barriers to progress on this issue and how to integrate assessment concerns in the wider context of Agenda 21. He suggested that more information on the costs associated with the different stages of needs assessments would be of value. In response, Zou Ji indicated that costs were hard to determine, although it was likely that major costs might be incurred at the survey stage.

Jørgen Fenhann said that although technology needs assessment was a fairly new concept, it was not necessary to start afresh on this issue, as there was already a great deal of relevant information and experience that could be built on in developing relevant methodologies. He drew attention to the paper's treatment of both "soft" and "hard" technologies, and its reference to both mitigation and adaptation technologies. He identified the challenge of turning the existing theory on technology transfer into a reality, cautioning that the "devil is in the details."

DISCUSSION: In the ensuing discussion, a number of delegates cautioned against adopting a "one-size-fits-all" approach to methodologies, which they said should be flexible enough to reflect countries' unique circumstances. One developed country speaker urged consideration of who would carry out and use the work on methodologies for technology needs assessments. Highlighting the significant role of the private sector, he noted that the question being addressed at this meeting appeared to relate to the public sector, and said his country would be unlikely to ask the question of what its technology needs are in this way. In response, another developed country participant stressed UNFCCC commitments and public-private sector linkages, which he said meant that strategies on technology transfer are necessary for all countries.

Summarizing the discussion, Chair Thorgeirsson drew attention to comments that methodologies should be able to be improved and revised to reflect increased knowledge and information gathered over time. He noted concerns that methodologies should not become overly complex and rigid, as this could form an obstacle to further progress. He highlighted participants' comments that methodologies should build on previous knowledge and not try to "reinvent the wheel," as well as statements highlighting the need for a country-driven approach that fits climate change strategies within each country's broader development goals. He drew attention to speakers' questions on the various actors involved in technology needs assessments, including who should be doing the work and for whom. He also noted comments on the need to address adaptation as well as mitigation to climate change in the context of technology transfer.

COUNTRY CASE STUDY PRESENTATIONS ON TECHNOLOGY NEEDS ASSESSMENTS: Javier Hanna Figueroa (Bolivia) and William Kojo Agyemang-Bonsu (Ghana) presented case studies on how technology needs assessment was approached in their respective countries. Javier Hanna Figueroa said Bolivia's experience was generally consistent with the working paper. He stressed that reducing vulnerability to climate change, which is a key issue for developing countries, means that the transfer of technology for adaptation can be particularly important. He underscored the need to strengthen international coordination to provide access to useful information on technology transfer opportunities. He reported on key elements of Bolivia's assessment, including the promotion of sustainable development, with a particular focus on the energy, industrial processes, and the forestry sectors.

On Ghana's experience, William Kojo Agyemang-Bonsu noted that an important element in its approach to technology needs assessment was the sectoral experts/core teams, which undertake in-depth analysis on, *inter alia*: sectoral policies and programmes; systemic, human or institutional barriers; and the market potential of the selected technologies. To prioritize Ghana's technology needs, he emphasized that the technology must contribute to wider development needs, including job creation, poverty reduction, and capacity building. In addition, he noted that technology needs are evaluated based on their contribution to reducing greenhouse gases. He said Ghana has identified industrial efficiency improvements and demand-side management as the highest technology priority areas in the energy sector.

DISCUSSION: In the subsequent discussion, participants' comments focused on:

- the importance of adaptation technologies for developing countries;
- strategies to overcome barriers to technology needs assessments;
- costs associated with needs assessments;
- the sustainable development component of needs assessments; and
- the use of development criteria, such as job creation, in selecting technologies.

One developed country speaker stressed the importance of using genuine examples in technology transfer, noting that experience in stakeholder meetings demonstrated how committed non-governmental organizations could take a leading role in promoting environmentally-sound technologies (ESTs).

SESSION THREE: ELEMENTS OF NEEDS ASSESSMENTS

The session on elements of needs assessments convened on Tuesday afternoon, 23 April. Delegates began by examining the participatory process in assessing technology needs, considering examples in designing such a process, and focusing on the role of various actors,

including government agencies and the private sector. The session then addressed the designing of technology needs assessments and selection of priority areas in terms of relevant technologies. It concluded with presentations and discussions on the integration of technology needs with current development programmes.

PRESENTATIONS ON THE PARTICIPATORY PROCESS IN ASSESSING TECHNOLOGY NEEDS: Vute Wangwacharakul (Thailand) presented his country's experiences in assessing its technology needs, including the process of undertaking its assessment. Identifying some conclusions drawn from their experiences, he argued that action and needs assessment should occur in parallel, given that actions in some sectors may be already apparent. He also highlighted the importance of an effective enabling environment and the need for strong support from Annex I Parties, especially on joint research development.

Sebastian Gallehr, Managing Director of the European Business Council for a Sustainable Energy Future ("e5"), discussed the role of the private sector in technology needs assessments. He identified the various elements that most investors require when considering possible ventures, highlighting the need for a comprehensive business plan, which should contain a financial analysis that conforms to an international standard, and include key indicators such as rate of return, net present value, depreciation, and payback period. The business plan should also include a sensitivity analysis. He highlighted the value of a strong relationship between investors and their business partners based on trust and proven reliability, and underlined that investors generally prefer a diversified portfolio to reduce risk.

DISCUSSION: In the ensuing discussion, several participants highlighted the value of clearly identifying key stakeholders/actors. One participant underlined the lessons and experience gained during the past decade through project- and programme-level experiences, such as GEF-funded activities.

Participants also considered the need to provide a sense of security for investors, with one speaker suggesting that technology needs assessments would demonstrate investment feasibility and sustainability. In response, Sebastian Gallehr highlighted that every private investor wants to be assured that there will be a return on his investment. He noted that you cannot change the approach investors take, but said you can use it to your advantage if you understand what influences the decisions they make.

PRESENTATIONS ON DESIGNING TECHNOLOGY NEEDS ASSESSMENTS AND SELECTING PRIORITY AREAS: Peter Pembleton, Project Manager, UNIDO, presented his experience on needs assessments and industry needs in Africa. He identified several obstacles to technology needs assessments, including stakeholders' different demands, difficulties in prioritizing technology needs, and the frequent absence of the appropriate technical backgrounds among stakeholders. In obtaining a reliable prioritized list of technology needs, he noted that while a multi-stakeholder dialogue is preferable, it is time and resource consuming. To address the challenges of technology transfer, he proposed the development of national systems of support involving local technology centers, experts and networks.

Ron Benioff, Acting Chair of CTI's Working Group on Technology Assessment and Capacity Building, outlined his organization's work in identifying specific actions that developing countries can take in partnership with businesses and donors to advance implementation of high priority adaptation and mitigation technologies. He noted that successful technology transfer programmes have included variations on the following five steps:

- establishment of collaborative partnerships between key stakeholders with the common purpose of enhancing technology transfer;
- implementation of technology needs assessments;
- design and implementation of technology transfer plans and specific actions;
- evaluation and refinement of the actions and plans; and
- dissemination of technology information.

On technology needs assessments, he stressed that the difficult stage begins after the technical priorities have been identified. He highlighted the experience of the Philippines, which had identified renewable energy for rural development as its highest priority. This enabled stakeholders to develop a carefully-considered approach, and led the government to create an enabling environment, including fast track policy reforms to streamline the approval process and to provide tax incentives.

In his presentation, Steve Halls, Director, UNEP-International Environmental Technology Center (IETC), spoke about the need for clear and standardized access to information on ESTs, arguing that inadequate information and tools to support decision-making represent significant barriers to technology transfer. He suggested that action is needed in the following areas:

- defining what ESTs are;
- developing criteria and guidelines on EST identification and selection;
- elaborating environmental performance criteria and guidelines for ESTs;
- setting-up regional networks for EST information and knowledge sharing; and
- establishing an enabling financial environment to enhance the adoption and use of ESTs.

DISCUSSION: In the subsequent discussion, several speakers referred to the amount of relevant information available on the Internet, drawing attention to discussions at the Technology Information Workshop held in Beijing from 18-19 April. One Annex I Party speaker endorsed the Internet as an effective tool, while observing that it should supplement rather than replace direct face-to-face interaction. A developing country participant stressed the need to increase awareness about the extensive information available on the Internet. Steve Halls outlined UNEP-IETC's work to establish filtering mechanisms and portals to ensure that only quality information is provided.

In response to a developed country participant's question on interagency cooperation and duplication of work, Peter Pembleton and Steve Halls outlined various cooperative initiatives between intergovernmental organizations, with Halls adding that one way to further such collaboration is to use the Internet and Intranets.

Replying to a question on the commercial viability of some technologies, Ron Benioff said that the needs assessment process should screen technologies to include only those that are viable. In response to a question on encouraging investment, he said CTI has attempted to screen project ideas to focus on those that might be attractive to investors, and then to identity which companies might be most interested in which projects.

DESIGNING ACTIONS: INTEGRATION OF IDENTIFIED TECHNOLOGY NEEDS WITH CURRENT DEVELOPMENT PROGRAMMES: Sung-Chui Shin, Senior Adviser, Korea Institute of Energy Research, discussed the Republic of Korea's integration of its identified technology needs within current development programmes. He outlined the current energy situation and policies in the Republic of Korea, discussed the country's main implementing

programmes and described its efforts at international collaboration on research and development. He argued that, unlike the Clean Development Mechanism (CDM), technology transfer within the UNFCCC is "intangible," with no credit or incentives provided, meaning that it is not realistic to expect voluntary technology transfer. To address this problem, he proposed that systematic or mandatory approaches be required to facilitate technology transfer under the UNFCCC. He also suggested the establishment or designation of "EST Technology Transfer Education Centers" as an effective method for capacity building. Finally, he proposed that the Expert Group on Technology Transfer recommend a COP decision urging Annex I Parties to submit a list of "public" ESTs and the terms and conditions governing their transfer.

Glicerio Eduardo Torres, Consejo Ciencia y Tecnologia, Peru, presented a country report on technology needs assessment for Peru. He outlined various technological options, including the use of natural gas, fuel cells as energy generators, micro-turbines, small hydroelectric systems, biofuels, solar energy, oceanic energy, geothermal energy, and specific technologies in the transportation, agriculture and agroforestry sectors. He outlined Peru's action plan, which includes:

- the establishment of a Consultant Group for Technology Transfer;
- promotion of a regional or subregional Center for Technology Transfer sited in Peru;
- more effective technology transfer from industrialized countries;
- an improvement in financing programmes and projects; and
- the creation of a special financial support project to strengthen internal capacities in research development, innovation, and training.

Marius Taranu, Expert on Needs Assessment at Moldova's Ministry of Ecology, Construction and Territorial Development, presented a case study of his country's programme on technology needs assessment and its integration with current national development programmes. He explained that the needs assessment programme aims to identify options for replacing inefficient energy technologies used in the energy and agricultural processing industry and to assess the economic viability of renewable energy resources. He highlighted the importance of integrating the technology needs identified with sustainable development strategies, and outlined the country's process of implementing Agenda 21, observing that sustainable development principles were adopted in his country in 1998.

Holger Liptow, Head of Project Climate Change, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), spoke on technology needs in the energy sector. Explaining that his organization aims to integrate technological issues into development cooperation, he highlighted its work on promoting renewable energies for rural energy supply, noting that some technologies are economically competitive with the small diesel pumps often used in developing countries. He indicated that GTZ's most successful work has been in China, where efficiency improvements through more effective energy management at 32 power plants resulted in a reduction of 500,000 tons of CO2 emissions annually. He stressed that the dissemination and marketing of ESTs must be on a commercially-sound basis.

UNDP SESSION ON THE NATIONAL COUNTRY STUDIES PROGRAMME

On Wednesday morning, 24 April, participants convened in Plenary for a special UNDP session on technology transfer activities under the National Country Studies Programme (NCSP). During this session, delegates heard presentations from ten national experts outlining their experiences, outcomes and difficulties in undertaking technology needs assessments under NCSP "top-up" activities. Following a general discussion on the issues raised by these experts, the session concluded with presentations on a recent UNDP/NCSP survey and on a practical methodology to conduct technology needs assessments.

COUNTRY PRESENTATIONS: National experts: Armenia spoke on the evolution of her country's climate change policy, which has now reached the implementation stage. She stressed that climate change technologies must meet local needs and be appropriate for local circumstances, and noted that a group of experts is to disseminate technical information on ESTs suitable for use in Armenia.

Burkina Faso identified its need for technologies such as low-emitting cooking and lighting equipment appropriate for domestic use. He said his country has organized case studies by sector to identify technologies for adaptation and mitigation needs.

Burundi indicated that his country had finished its first national communication in November 2001. He noted that 60% of his country's greenhouse gases are energy-sector related, and mainly from biomass and kerosene. He said one of the energy efficient technologies Burundi aims to employ is solar energy for lighting and refrigeration purposes.

Georgia explained that its energy and industry sectors are the main focus for greenhouse gas emissions reduction, mainly through improving energy efficiency. She informed participants that several proposals to reduce greenhouse gas emissions are being discussed, including modernizing a cogeneration facility in Tbilisi, improving the electricity transmission system, and installing energy efficient street lighting.

Indonesia presented a report on the *Identification of Less Greenhouse Gases Emission Technologies in Indonesia*, which was financed by the GEF and supported by UNDP. The report concludes that climate change will threaten Indonesia's long-term food security. Several technology options are discussed in the report, including switching from diesel oil to liquefied petroleum gas (LPG) for buses and reducing methane emissions from rice fields.

Lebanon set out some specific actions his country is considering, including promoting renewable energy, energy efficiency, and fuel switching. He noted that, in one project, Lebanon achieved a 90% reduction in methane emissions from a solid waste facility at a cost of US$11.9/ton, and underscored that UNFCCC Article 4.5 urges developed countries to strengthen the endogenous capacities of non-Annex I Parties.

Niger described the difficult circumstances of his country, including drought and the threat to food security. He noted that climate change will only exacerbate this situation.

Sudan described some of the institutional barriers – including the absence of a legal framework and lack of qualified technical people – that affect technology needs assessment and the formulation and implementation of effective adaptation and mitigation strategies.

Togo described its technology transfer activities, highlighted the benefits of learning from other countries' experiences, and urged more assistance from CTI and other organizations to help developing countries with their work.

Bhutan highlighted its vulnerability due to its mountainous ecosystem, and identified lack of data and information on appropriate technologies for its special circumstances as major constraints.

Discussion: Chair Thorgeirsson opened the general discussion on country presentations, drawing attention to comments in the presentations on adaptation and risk assessment, and a focus on the need to use the most suitable rather than the newest or most advanced technolo-

gies. One developed country participant highlighted comments about "not reinventing the wheel" and building on previous experiences in developing methodologies.

A developing country speaker drew attention to the preponderance of mitigation rather than adaptation technology efforts, stating that the approach to adaptation was primarily one of vulnerability assessment. In response, a speaker from an intergovernmental organization stated that, while there had previously been a greater emphasis on mitigation, actions had recently been taken to address concerns about adaptation, including the development of adaptation guidelines and a fund.

Replying to a question about the role of National Adaptation Programmes of Action (NAPAs), Janos Pasztor, UNFCCC Secretariat, explained that they are exclusively for the least developed countries (LDCs), and are not a methodology for adaptation but rather a method or framework to develop an action plan at a national level. On the status of NAPAs, he said COP-7 had approved the approach for NAPAs and the GEF had developed an operational strategy for funding this work, which now has to be considered by the GEF Council. He also highlighted the role of the LDC Expert Group (LEC) in supporting NAPA development.

One developing country participant stressed the value of traditional and indigenous knowledge on adaptation to the climate and weather patterns, arguing that traditional as well as western technological solutions need to be considered. Another non-Annex I Party speaker highlighted the existence of some obvious adaptation technologies in developed countries, such as early warning systems and modeling and forecasting capacities, and said these presented clear opportunities for technology transfer.

SUMMARY OF UNDP/NCSP SURVEY: Yamil Bonduki, Technical Advisor, National Communications Support Programme, UNDP-GEF, presented a summary on a recent UNDP/NCSP survey. He noted that technology transfer issues are only briefly referred to in countries' national communications. His survey indicated that 55 countries had been provided with additional "top-up" support for their technology needs assessments, and that an additional 30-40 countries may submit "top-up" proposals. He observed that the focus is generally on mitigation technologies and that an assessment of technology needs for adaptation is a priority that needs to be addressed. He concluded that lack of practical guidance is the most important constraint for assessing technology needs.

A PRACTICAL METHODOLOGY TO CONDUCT TECHNOLOGY NEEDS ASSESSMENTS: Rob Gross, UNDP/NCSP Consultant, spoke about a project to develop a practical methodology handbook for conducting technology needs assessments. He emphasized that the project will build on existing work, with the goal being to go beyond the level of explaining the process of technology transfer and actually to develop useful guidance on how resource and technology options, market and institutional issues and policy priorities can work to the advantage of specific countries. He stressed that some issues will be generic while other topics will be country specific. Indicating that the handbook will be a "living document" that will evolve over time and can be adapted to particular circumstances, he said that a final draft should be available in September 2002.

Discussion: In the ensuing discussion, a number of participants asked for clarification on various details of the handbook, and several speakers stressed that the handbook should complement other relevant work, rather than duplicate it. Responding to questions about the timing of the handbook, Rob Gross stressed that technology needs assessment is not a "once-and-for-all process" and will have to be revisited periodically. Yamil Bonduki added that, although some countries are too far along the current process to use the handbook for their needs assessments, many others are not, and will therefore be able to benefit from it. He responded to one participant's concern that the handbook might focus on mitigation by indicating that this was not the case, adding that mitigation analysis experiences will be useful for adaptation work.

One speaker called for an inventory of technologies, which she said could provide recommendations based on the circumstances of the type of country reviewing the technology options. A developed country participant said technology needs assessments should not just establish what technology to use for a specific project, but could also contribute to the development of a wider national technology policy.

SESSION FOUR: TECHNOLOGY TRANSFER ACTIVITIES AND INITIATIVES

On Wednesday afternoon, delegates convened for a session on technology transfer activities and initiatives. The session began with four presentations on developed countries' technology transfer activities in support of UNFCCC Article 4.5, focusing on the assistance provided in acquiring mitigation and adaptation technologies. Delegates then considered multilateral initiatives and other technical assistance programmes by international organizations.

DEVELOPED COUNTRIES' ACTIVITIES ON TECHNOLOGY TRANSFER: Alexandra Mallett, Policy Analyst, Natural Resources Canada, explained Canada's approach to technology transfer and described some of the opportunities that exist for countries to capitalize on existing and future programmes. She emphasized that Canada aims to promote climate technologies that reduce greenhouse gases and create opportunities for domestic industry. Stressing the global nature of the climate change problem, she said Canada is indifferent as to where reductions in greenhouse gases are achieved. To facilitate reductions overseas, she indicated that significant resources have been made available through the CDM and JI Office, and through the Canada Climate Change Development Fund. In addition, Canada is launching the Canadian International Technology Initiative. She concluded by highlighting Canada's support for private sector involvement and host country-driven technology needs assessment.

Vivi Yieng-Kow, Senior Advisor, Danish Environmental Protection Agency, stated that Denmark's approach to technology transfer is to integrate it within existing development assistance programmes that focus on poverty reduction through sustainable development. Such development assistance is usually bilateral, allocated for a five-year period, and funneled through DANIDA – the Danish international development agency. She highlighted some existing initiatives, including programmes in Nepal, Ghana, Burkina Faso, Mozambique and Egypt. On environmental aspects of the development assistance programme in Nepal, she highlighted initiatives to replace 15,000 wood stoves with low-emitting cooking stoves, generate electricity from micro-hydro dams, and promote solar energy in households. She stressed the difficulty of incorporating long-term sustainable development factors into decision making.

Ko Barrett, Director of the Climate Change Programme at the US Agency for International Development, briefed participants on US technology transfer activities. She noted that President George W. Bush's new climate change policy highlights technology transfer as a key priority, and allocates US$4.5 billion for climate change domestically and internationally. On needs assessments, she concluded that methodologies risk being irrelevant if the right entry point for technology transfer has not been identified and key stakeholders have not been engaged. She also suggested that both "long and quick yield"

measures are relevant to effective technology transfer, development and innovation, and that proper stakeholder buy-in is the key to sustainability.

Arthur Riedacker, Senior Advisor, Mission Interministerielle de l'Effet de Serre, France, outlined his country's technology transfer activities, programmes and plans. He drew attention to an event taking place in November 2002 – the Pollutec Annual Exhibition – which he described as the largest annual exhibition in Europe of environmental equipment, technology and services for industry and local authorities. The exhibition will coincide with a Seminar on North-South Technology Cooperation for Sustainable Development and Climate.

MULTILATERAL INITIATIVES AND OTHER TECHNICAL ASSISTANCE PROGRAMMES: Peter Pembleton, Project Manager, UNIDO, outlined UNIDO's support for industry under the UNFCCC. He described UNIDO's programme, which aims to mobilize national, subregional and regional capacity and to develop mechanisms that support industrial technology transfer. He described the three stages of work – the preparation of background studies, provision of preparatory assistance, and implementation of the programme. On results achieved to date, he said UNIDO had started with six African experts and now has over 200 individuals involved in its Africa network, as well as activities in several ASEAN countries. He said the approach taken has been characterized by a bottom-up, multi-stakeholder, learning-by-doing approach involving public-private sector partnerships.

Nandita Mongia, GEF's Asia-Pacific Regional Manager and Technical Advisor for Climate Change, highlighted the work of the GEF in supporting technology transfer in a climate change context. She noted that the GEF provides additional and incremental funding of activities that directly contribute to greenhouse gas emissions reductions. To date, the GEF has disbursed approximately US$1.5 billion through its Operation Programmes (OPs). While most programmes must show an immediate environmental benefit, she said money can also be disbursed to commercialize promising new energy technologies that may result in a future environmental benefit. She explained that while the GEF is not directly mandated to support technology transfer, it does promote such activities by supporting technology evaluation, training, policy review and development, and the improvement of financial and business skills. In addition, the GEF assists in removing barriers to the large-scale application, implementation, and dissemination of least-cost, commercially-established or newly-developed energy efficient technologies. On lessons learned, she cited the need to distinguish the larger body of relevant stakeholders from the key national partner, and the fact that this key national partner differs from country-to-country. She stressed that it is crucial to engage the key stakeholder from the beginning of the project cycle.

Elmer Holt, CTI Vice Chair, outlined the technical assistance for needs assessments available from CTI, describing a range of activities in various developing countries and countries with economies in transition (EITs). He then described CTI's activities under the Cooperative Technology Implementation Plan (CTIP) programmes, which include financial, technical and facilitative roles. Identifying some possible future roles for CTI in relation to needs assessment, he suggested that it could:

- convene a workshop on training and/or sharing country experiences;
- assist with donor matchmaking systems;
- extend technical support for technology needs assessments to additional countries;
- further cooperate with UNDP on a handbook; and
- augment current efforts to track technology-related training programmes and match these with country needs.

He concluded by observing that needs assessment it is not an end in itself, but is one critical component in a process that should also include building capacity, creating an enabling environment, and developing a practical plan of implementation.

SESSION FIVE: POSSIBLE POST-NEEDS ASSESSMENTS ACTIVITIES

On Wednesday afternoon, participants addressed the issue of activities that could follow the needs assessment process. The session began with presentations on case studies of technology transfer projects and partnerships, which outlined follow-up actions after the completion of needs assessments. This was followed by presentations on the dissemination of technology needs information through technology information systems, and on technology transfer and Parties' national communications.

CASE STUDIES OF TECHNOLOGY TRANSFER PROJECTS AND PARTNERSHIPS: Suk-Hoon Woo, Economic Advisor on Economic Policy Coordination in the Office of the Prime Minister of the Republic of Korea, examined technology transfer in a bilateral programme and lessons learned in the Republic of Korea. Outlining its technology transfer experiences over the past three years, he described the various stages of this work, including the selection of focus areas for technology transfer and activities undertaken in those areas. In this regard, he reported on a bilateral technology transfer initiative involving an energy service company (ESCO), Hyundai Motors and a US partner. Summarizing lessons learned, he said technology transfer must be considered in the context of national strategies and reflect national circumstances, and stressed that experience and history are important in determining the success of technology transfer efforts, highlighting the evolutionary nature of the process and the need to take into account previous energy investments.

Kishan Kumarsingh, Technical Coordinator for Trinidad and Tobago's Environmental Management Authority, presented several examples of small island States' experiences with technology transfer. He began by identifying some key issues for small island States, including: the need for "soft" technologies that can be used to develop local climate models; the importance of an ongoing assessment of vulnerability and adaptation options; and the benefits of establishing a technology information network with a focus on adaptation. He emphasized the need for capacity building to address such issues, and highlighted positive experiences in South-South cooperation. He highlighted several examples of success stories in small island States, including the electrification of rural areas using solar photovoltaic systems in Pacific Island countries and the use of solar water heating systems in Cyprus.

DISSEMINATING TECHNOLOGY NEEDS INFORMATION THROUGH TECHNOLOGY INFORMATION SYSTEMS: Florin Vladu, Programme Officer, Technology, UNFCCC Secretariat, spoke about the dissemination of technology needs information through "TT:Clear," a programme proposed by the UNFCCC that aims to improve the flow of, and access to, information related to the development and transfer of ESTs. He explained that a prototype has been up-and-running since September 2001, and that 1650 projects are now in the UNFCCC's database, with users being able to access information by using search criteria. He also noted that TT:Clear would act as a gateway to information from outside sources.

Li Junfeng, Deputy Director General, Energy Research Institute, China, examined the role of the UNFCCC's Technology Website, identifying who needs the website, what kind of information they

require, what can be achieved from the website, the role of the website, and how it can be developed so that it meets visitors' needs. He indicated that the primary users would be decision makers, manufacturers, investors, and research and development institutions, and said it would supply information on relevant policies, technologies and investment opportunities, and would seek to act as a bridge between those supplying and demanding technologies.

TECHNOLOGY TRANSFER AND NATIONAL COMMUNICATIONS: George Manful, Head of the Capacity Building/GEF Unit with the UNFCCC Implementation Programme, spoke on technology transfer and national communications. He indicated that 80 initial non-Annex I national communications had been received as of 18 April 2002. Commenting on the content of the initial communications, he said technology transfer issues had been referred to only in a "very superficial" manner, and that these references related mainly to mitigation rather than adaptation projects. Issues mentioned in the communications, but not elaborated on in any detail, included the cost of technologies, barriers to technology transfer, institutional and technical capacities, and the availability of information. He also drew attention to the work of the Consultative Group of Experts on non-Annex I communications and to the revised guidelines for preparing national communications adopted at COP-7.

WORKING GROUPS

On Thursday morning, 25 April, participants met in three parallel working groups with the aim of developing recommendations on methods and tools for assessing technology needs, as well as recommendations on the types of assistance required to carry out technology needs assessments. The three working groups, which each had the same mandate and goals, were convened in order to provide an informal, small-group setting designed to allow all participants to provide input on the development of these recommendations.

The working groups considered four questions designed to help guide them in formulating their ideas and recommendations:

- Are the existing methodologies for needs assessments adequate and, if not, how can they be improved?
- What are the potential barriers in technology needs assessments and what specific actions can be taken to overcome these barriers?
- What capacity building and technical assistance is needed to undertake needs assessments?
- What possible follow-up activities can be pursued related to needs assessments?

The working groups were chaired by Anthony Olusegun Adegbulugbe (Nigeria), William Kojo Agyemang-Bonsu (Ghana) and Javier Hanna Figueroa (Bolivia). Each group also appointed a rapporteur to report back to the Plenary with their findings.

WORKING GROUP REPORTS: The working groups reported back to Plenary with their conclusions and recommendations on Thursday afternoon.

Group I: Group I Rapporteur Alexandra Mallett (Canada) reported participants' recommendation that the use of methodologies should be a country-driven process. Noting that a number of different methodologies exist, she highlighted the group's view that each has advantages and disadvantages that may make them useful in different contexts.

On barriers and constraints, she noted statements relating to: the need to identify the most appropriate and relevant technology needs, rather than producing a "wish list"; inadequate information, including the absence of systems and tools, data and information, and efficient networks; a lack of buy-in and ownership of the process; inadequate human resources; and insufficient institutional capacity. She highlighted participants' comments on the need to integrate needs assessments within the context of national development strategies and to coordinate this integration into the national development planning cycle. She noted linkages between capacity building and technical assistance, and calls for training and increasing awareness of relevant tools through multilateral agencies, as well as support for increased access to essential tools such as computers, software, and the Internet.

Outlining possible follow-up activities relating to technology needs assessments, she drew attention to suggestions for:

- enhanced access to funding;
- hands-on training on methodologies;
- the compilation of user manuals;
- increased work on vulnerability and adaptation;
- the promotion of coordination among donors and agency programmes;
- "matchmaking" for desired technologies;
- linkages with business networks and export credit agencies;
- development of a roster of technical experts;
- a review of past experiences;
- development of an implementation plan; and
- accessing of funds for needs assessments and post-assessment work.

Group II: Rapporteur Imran Habib Ahmad (Pakistan) said the group's discussion on methodologies had highlighted the view that "one size does not fit all," that technology needs assessments should be a country-driven process, and that UNFCCC Article 4.5 must be the key driver. On the adequacy of methodologies and tools, he said participants had stressed that they do provide a useful framework, while not providing a total solution, given the country-driven nature of the process.

He reported that the group had identified five major barriers in technology needs assessments:

- the over-proliferation of methodologies;
- inadequate human capacity;
- lack of "meaningful" information;
- financial constraints; and
- institutional problems.

He then outlined the group's suggested actions to overcome these barriers. On actions on methodologies, he said participants had endorsed the "added value" they brought, while making it clear that they supported the elaboration of a simple description of steps outlining the critical elements for needs assessments. Regarding the lack of human capacity, he said participants had stressed the need to better use countries' existing capacity, ensuring that people are correctly placed and trained, with use of regional and international resources if problems persist.

On actions to address the lack of meaningful information, Imran Habib Ahmad said the group had proposed improved access to information, including through the Internet, and the holding of relevant workshops and meetings. Regarding financial resource constraints, he highlighted participants' comments supporting the effective utilization of existing resources/funding sources, and stressing the need to ensure that commitments under the UNFCCC are met. On actions to address institutional constraints, he noted comments supporting the creation of a favorable enabling environment.

He concluded by highlighting statements on the use of "common sense" in deciding how to proceed and determining what steps to take, the need for further work on adaptation, and the fact that needs assessments are simply the starting point towards real technology transfer, not an end in themselves.

Group III: Rapporteur Nabil Mina (Lebanon) reported that the group had identified various barriers and constraints, including: limited resources for countries to undertake comprehensive work; lack of data, information, and tools for analysis; and inadequate in-country capacity. Possible means to overcome these barriers identified by participants included more research and development, increased public awareness, and the establishment of institutions to utilize resources more efficiently. On capacity building, he said participants had highlighted the need to develop endogenous capacities, the importance of capacity building for adaptation, and the value of permanent cooperative research programmes. On follow-up activities, his working group had suggested: broader dissemination of information on technical needs assessment and training on their use; the establishment of a fund for coordination and training; and the efficient use of the funds that are already available.

Discussion: In the ensuing discussion on the working group reports, one participant emphasized that, while the methodologies were not yet well known, those who had undertaken needs assessments without such methodologies had intuitively taken a similar approach. Another participant suggested that the term "technology needs assessment" had been demystified by this meeting.

CLOSING REMARKS

Participants heard closing statements on Thursday afternoon. Jong Whan Noh, Chief Project Officer, KEMCO, thanked participants for their attendance and said he looked forward to cooperating with members of the Expert Group on Technology Transfer in the future.

Janos Pasztor, UNFCCC Secretariat, conveyed Chair Thorgeirsson's congratulations on such a constructive gathering, and his regrets that he could not attend the closing Plenary. He noted that SBSTA-16 will address needs assessment and consider the ideas and recommendations raised by participants, and expressed his gratitude to the meeting presenters, participants, KEMCO and the local staff, and the *Earth Negotiations Bulletin* for reporting on this meeting.

Wanna Tanunchaiwatana, UNFCCC Secretariat, expressed her pleasure at the outcome of the meeting, which she said was very positively influenced by the high-quality and expertise of the participants.

William Kojo Agyemang-Bonsu (Ghana), who chaired the closing Plenary, thanked the UNFCCC Secretariat for its "wonderful" efforts in preparing for this meeting. Observing that "we have started a process" that would be continued at SBSTA-16, he thanked participants and closed the meeting at 2:15 pm.

THINGS TO LOOK FOR

UPCOMING CLIMATE CHANGE WORKSHOPS: A number of climate change workshops will be held prior to the 16th session of the UNFCCC subsidiary bodies. These include the following:

- Workshop on cleaner or less greenhouse gas-emitting energy, Whistler, Canada, 7 - 8 May 2002;
- Workshop on the status of modeling activities to assess the adverse effects of climate change and impacts of response measures, Bonn, Germany, 16 - 18 May 2002;
- Pre-sessional consultations on registries, Bonn, Germany, 2 - 3 June 2002; and
- Pre-sessional workshop on the draft revised uniform reporting format for activities implemented jointly, Bonn, Germany, 2 - 3 June 2002.

For more information, contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; Internet: http://www.unfccc.int

CONFERENCE ON EU AND GERMAN CLIMATE POLICY - CHALLENGES BEFORE THE ENTRY INTO FORCE OF THE KYOTO PROTOCOL: This meeting will be held from 6-8 May 2002, in Hamburg, Germany. Organized by the Hamburg Institute of International Economics, the conference will focus on the ratification of the Kyoto Protocol in the EU, challenges with regard to EU national climate strategies, internal EU emissions trading, integration of EU accession countries, the role of the Kyoto mechanisms, and EU strategies for achieving entry into force. For more information, contact: Axel Michaelowa, Hamburg Institute of International Economics; tel: +49-404-283-4309; fax: +49-404-283-4451; e-mail: michaelowa@hwwa.de; Internet: http://www.hwwa.de/climate.htm

CONFERENCE AND WORKSHOP ON CLIMATE VARIABILITY AND CHANGE AND THEIR HEALTH EFFECTS IN THE CARIBBEAN: This conference will take place from 21-25 May 2002, in Bridgetown, Barbados. The conference is being sponsored by the Pan-American Health Organization and the WHO under the auspices of the Interagency Network on Climate and Human Health. Participants will consider climate variability and climate change, linkages between climate and human health, and public health policies and strategies for adaptation to climate variability and change. For more information, contact the Pan-American Health Organization, tel: +1-246-426-3860; fax: +1-246- 436-9779; e-mail: cpcadmin@cpc.paho.org; Internet: http://www.cpc.paho.org

FOURTH SESSION OF THE PREPARATORY COMMITTEE FOR THE WSSD: PrepCom IV will take place from 24 May - 7 June 2002, in Bali, Indonesia. PrepCom IV will include Multi-Stakeholder Dialogues and a Ministerial Segment, and is expected to complete the document on review of Agenda 21, with recommendations for further action, and develop a concise political document, to be submitted to the WSSD. For more information, contact: Andrey Vasilyev, DESA; tel: +1-212-963-5949; fax: +1-212-963-4260; e-mail: vasilyev@un.org; Major groups contact: Zehra Aydin-Sipos, DESA; tel: +1-212-963-8811; fax: +1-212-963-1267; e-mail: aydin@un.org; Internet: http://www.johannesburgsummit.org/

16TH SESSION OF THE UNFCCC SUBSIDIARY BODIES: SB-16 will take place in Bonn, Germany, from 5-14 June 2002. For more information, contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; Internet: http://www.unfccc.int

WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT: The World Summit on Sustainable Development will take place from 26 August - 4 September 2002, in Johannesburg, South Africa. For more information, contact: Andrey Vasilyev and Zehra Aydin-Sipos, DESA (see above).

EIGHTH CONFERENCE OF THE PARTIES TO THE UNFCCC: COP-8 is scheduled to take place from 23 October - 1 November 2002, in New Delhi, India. For more information, contact the UNFCCC Secretariat (see above).

"POLLUTEC" ANNUAL EXHIBITION AND TECHNOLOGY SEMINAR: The Pollutec Annual Exhibition will take place from 25-29 November 2002 in Lyon, France. The largest annual exhibition in Europe for environmental equipment, technology and services for industry and local authorities, this event is expected to attract 60,000 visitors and 2000 exhibitors from 33 countries. The exhibition will coincide with a Seminar on North-South Technology Cooperation for Sustainable Development and Climate. For more information, contact: e-mail: a.reidacker@mies.pm.gouv.fr; Internet: http://www.pollutec.com