



SUMMARY OF THE WORKSHOP ON EMISSIONS PROJECTIONS FROM ANNEX I PARTIES: 6-8 SEPTEMBER 2004

The United Nations Framework Convention on Climate Change (UNFCCC) workshop on emissions projections from Parties included in Annex I of the UNFCCC was held from 6-8 September 2004, at the Wissenschaftszentrum in Bonn, Germany. Over 80 participants from Annex I and non-Annex I Parties, as well as non-governmental organizations, were in attendance. The workshop represented the first occasion for Parties to consider emissions projections in detail.

The workshop was mandated by SBSTA-19, which requested the UNFCCC Secretariat to organize a workshop to support the preparation of the fourth national communications of Annex I Parties. The purpose of the workshop was to address methods, assumptions, indicators, key parameters of models and sensitivity analysis, and dissemination of methodologies for estimating emissions projections. A report on the workshop will be prepared by the Secretariat for consideration by SBSTA-21, meeting in conjunction with the tenth Conference of the Parties (COP-10) in December 2004, in Buenos Aires, Argentina.

During the workshop, participants met in plenary and parallel sessions to address a number of challenges and exchange experiences related to projecting greenhouse gas emissions. On Monday, 6 September, they addressed general and cross-cutting issues and heard presentations on national experiences that were followed by question and answer sessions. In the afternoon, participants discussed questions raised in a working paper on general and cross-cutting issues prepared by the Secretariat for the workshop. On Tuesday, 7 September, participants met in two parallel groups to discuss specific issues relating to energy, industry and waste, and specific issues relating to agriculture, land use, land-use change and forestry (LULUCF). Each group heard presentations on national circumstances, most of which were followed by a question and answer session, and addressed questions raised in two working papers on energy, industry and waste, and agriculture and LULUCF, respectively. On Wednesday, 8 September, participants met in plenary to consider the discussion outcomes, pending issues, recommendations and conclusions.

A BRIEF HISTORY OF EMISSIONS PROJECTIONS UNDER THE UNFCCC

Climate change is considered one of the most serious threats to sustainable development, with adverse impacts expected on human health, food security, economic activity, water and other natural resources, and physical infrastructure. Global climate varies naturally, but scientists agree that rising concentrations of anthropogenically-emitted greenhouse gases in the Earth's atmosphere are leading to changes in the climate.

Scientific observations on climate change were brought to policy-makers' attention in the late 1970s. Scientific uncertainty was high, and debate on whether or how to take action took place throughout the 1980s. By the end of the decade, the international community had agreed that a global framework for action was necessary to stabilize the atmospheric concentrations of greenhouse gases in order to avoid "dangerous anthropogenic interference" with the climate system. Gases that were considered necessary to control included methane, nitrous oxide, and, in particular, carbon dioxide.

Negotiations on the UNFCCC began in 1991, and governments adopted it in June 1992. The UNFCCC entered into force on 21 March 1994, and now has 189 Parties.

KYOTO PROTOCOL: In 1995, the first meeting of the Conference of the Parties to the UNFCCC (COP-1) established the *Ad Hoc* Group on the Berlin Mandate to negotiate action for the period beyond 2000, including the strengthening of the commitments of Annex I Parties through the adoption of a protocol or

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another legal instrument. Following intense negotiations that concluded at COP-3 in Kyoto, Japan, in December 1997, delegates agreed to a Protocol to the UNFCCC that commits developed countries and countries with economies in transition (EITs) to achieve quantified emissions reduction targets. These countries, known under the UNFCCC as Annex I Parties, agreed to reduce their overall emissions of six greenhouse gases by at least 5% below 1990 levels between 2008 and 2012 (the first commitment period), with specific targets varying from country to country. Gases included are carbon dioxide, methane, nitrous oxide, perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride.

Since COP-3, Parties have negotiated most of the rules and operational details determining how to reduce emissions and measure and assess these emissions reductions. To enter into force, the Protocol must be ratified by 55 Parties to the UNFCCC, and by Annex I Parties representing at least 55% of the total carbon dioxide emissions for Annex I Parties in 1990. To date, 124 Parties have ratified the Protocol, including 32 Annex I Parties representing 44.2% of the emissions required for entry into force.

NATIONAL COMMUNICATIONS: As part of their UNFCCC commitments, Annex I Parties are required to submit a national communication on a regular basis (approximately every 4-5 years). At COP-5, which met in October/November 1999, Parties adopted guidelines for preparing and reporting Annex I national communications. The guidelines require Annex I Parties to provide information on:

- national circumstances relevant to greenhouse gas emissions and removals;
- greenhouse gas inventories;
- vulnerability assessments, climate change impacts and adaptation measures;
- financial resources and transfer of technology;
- research and systematic observation; and
- education, training and public awareness.

The national communications also request information on policies and measures (P&Ms) implemented by Parties to mitigate emissions, and projections of emissions estimates up to 2020 for all sectors. The majority of Annex I Parties are now in the process of preparing their fourth national communications, due for submission by 1 January 2006.

WORKSHOP BACKGROUND: At SBSTA-19, meeting in conjunction with COP-9, in December 2003, in Milan, Italy, Parties examined data showing that, while the aggregate 2000 greenhouse gas emissions of Annex I Parties were below 1990 levels, these emissions are expected to increase in the period 2000-2010. Data was compiled based on information in national communications and from in-depth reviews of the communications carried out by the Secretariat. As a result of the data, Parties agreed to take further action to implement P&Ms to contribute to modifying longer-term trends in emissions. The COP decided to request the Secretariat to prepare a summary report of the in-depth reviews of Annex I national communications, as well as to organize a workshop to facilitate timely submission of fourth national communications. SBSTA-19 also agreed that a workshop on emissions projections was necessary in order to support the preparation of fourth national communications.

REPORT OF THE WORKSHOP

Halldór Thorgeirsson, Coordinator of the Subsidiary Body for Scientific and Technological Advice (SBSTA), UNFCCC Secretariat, welcomed participants and read a statement on behalf of SBSTA Chair Abdullatif Benrageb (Libya), who was unable to be present at the workshop and, therefore, requested Hans-Joachim Ziesing (Germany), Micheal Young (Ireland) and Neil Ferry (Australia) to facilitate the workshop on his behalf.

Stelios Pesmajoglou, UNFCCC Secretariat, recalled the mandate of the workshop, including to:

- hold technical discussions on methodological issues relating to the preparation of greenhouse gas emissions projections;
- hold an open exchange of views and experiences in preparing projections;
- discuss lessons learned and identify areas for further improvement; and
- address methods, assumptions, indicators, key parameters, sensitivity analysis and dissemination of methodologies for emissions projections.

He observed that findings during in-depth reviews and reflected in the compilation and synthesis (C&S) of third Annex I national communications indicate shortcomings in the projection of emissions. He said the three working papers prepared by the Secretariat for the workshop highlight issues for participants to discuss and are based on the C&S of third national communications, in-depth reviews, views of Parties, and Secretariat experience. He said the workshop was expected to provide a report to SBSTA-21 containing conclusions and/or recommendations, including on methodological challenges to preparing greenhouse gas projections to assist in the preparation of Annex I fourth national communications.

Electronic versions of the presentations are available on the UNFCCC Website:

<http://unfccc.int/sessions/workshop/060904/present.html>

GENERAL AND CROSS-CUTTING ISSUES

The discussion on general and cross-cutting issues was chaired by Hans-Joachim Ziesing.

Sergey Kononov, UNFCCC Secretariat, introduced the three working papers prepared for the workshop on: general and cross-cutting issues (Working Paper 1, http://unfccc.int/sessions/workshop/060904/documents/workpaper_1.pdf); issues in the preparation of greenhouse gas projections for the energy sector, transport, industry and waste management (Working Paper 2, http://unfccc.int/sessions/workshop/060904/documents/workpaper_2.pdf); and issues in the preparation of greenhouse gas projections for agriculture and LULUCF (Working Paper 3, http://unfccc.int/sessions/workshop/060904/documents/workpaper_3.pdf).

He noted that Working Paper 1 distinguishes between issues related to the reporting of projections, including compliance with the UNFCCC guidelines on national communications, and issues related to methodologies used to develop the projections, including preparation of scenarios, key modeling problems, uncertainties, and other issues.

PRESENTATIONS ON NATIONAL EXPERIENCES:

Francis Bossier, Federal Planning Bureau, Belgium, described the methodology used to develop emissions projections in his country's third national communication, which includes a combination of models for projections to 2010 and 2020, taking into account scenarios "with measures" and "with additional



measures," such as the introduction of a carbon dioxide tax and the effects of non-fiscal measures. He noted problems with data quality and with the use of a combination of models and underlined the need to quantify uncertainties.

Participants discussed difficulties in incorporating different regional policies and integrating additional non-fiscal measures. Bossier emphasized the importance of presenting contrasting scenarios, to avoid giving simplistic signals to policymakers.

Takaaki Ito, Ministry of Environment, Japan, said the national Guideline for Measures to Prevent Global Warming, adopted in March 2002, is being updated. He described methods used by Japan to project emissions of different sectors. Ito highlighted three problems: projecting emissions for the land-use change and forestry (LUCF) sector; estimating business as usual emissions; and lack of data in the residential and commercial sectors.

Leonard Brown, Climate Change Office, New Zealand, presented on projecting greenhouse gas emissions and removals in his country. He reflected on whether the interests of those using projections, apart from UNFCCC Parties, should be considered. He said documentation on models presented in national communications should enable verification and duplication. He highlighted the importance of consistency in key assumptions, such as gross domestic product (GDP), across sectors and models, and pointed to work on quantitative uncertainty estimation. He noted inconsistencies between the need for short-term projections for meeting Protocol targets, long-term projections resulting from models, and UNFCCC requirements for medium-term projections.

Andrea Edelmann, Environment Agency, Austria, presented on the Austrian experience with emissions projections, emphasizing two main challenges: institutional arrangements and methodological issues. She noted that a major administrative effort was required to incorporate the views of all relevant stakeholders in the different institutions. On methodological issues, Edelmann outlined Austria's use of a combination of top-down models with consistency and bottom-up plausibility checks, and the elaboration of sensitivity analysis.

Participants discussed the disaggregation of sectors within models, pessimistic and optimistic projections in the sensitivity analysis, and communication between different sectors and institutions. Replying to a question on the use of different model types, Edelmann underscored the importance of considering interlinkages between sectors as well as of using the same economic parameters for all calculations.

Stane Merše, Energy Efficiency Center, Slovenia, presented on the methods and challenges in Slovenian emissions projections. He said Slovenia faces a challenging task in meeting its emissions reduction commitments, but pointed to awareness raised by the European Union (EU) Emission Trading Scheme, which is leading to better greenhouse gas inventories. He said policies related to greenhouse gas control have recently been incorporated into energy policy.

Merše noted both advantages and disadvantages in projecting emissions due to Slovenia's small size. While it enables individual treatment of the main greenhouse gas sources, he said the disadvantages include changes in project realization, cross-border influence, for instance in emissions from transport fuels, and the lack of macroeconomic forecasts. Describing the models used, he said technology changes for different sectors are also considered. Responding to a question from China on the source of this information, Merše said Slovenia is carrying out energy audits, and that precise data on some energy technologies is available for bigger

companies. He said the bottom-up technology-oriented approach used by Slovenia involves data uncertainty, but ensures better process knowledge.

Anne Kristin Fosli, Ministry of Finance, Norway, spoke on facts and experiences regarding emissions projections in her country. She said carbon dioxide projections are based on a macro-economic model and combine top-down and bottom-up approaches. She noted that projections are updated every four years in conjunction with analysis of the Norwegian economy and observed that updated projections for 2010 and 2020 will be published in November 2004. Regarding emissions calculations, she said micro-information, such as oil-production data, is used to adjust or overrule model projections. She outlined challenges, including how to: ensure consistency between macro-level and activity data fed into the macro model and emissions projections that rely on large amounts of micro-information; deal with voluntary agreements in projections and scenarios when measures and emissions reductions can be achieved anyway; and interpret different scenarios in the reporting guidelines. Regarding LUCF projections, she said challenging projections include those for: harvesting rates, as this is mainly driven by international timber prices; increases in natural decay due to reduced harvesting rates; changes in soil carbon stock due to changed harvesting rates; effects of past measures; and carbon changes in marginal forests.

Responding to a question regarding how P&Ms are implemented in the models, Fosli said models are updated when P&Ms are implemented.

Hartmut Behrend, Environment Directorate-General, European Commission (EC), reported on the adoption of a new Monitoring Decision to harmonize P&Ms in the 25 EU Member States. He said this decision requires reporting emissions projections every two years on, *inter alia*, existing and additional P&Ms, sensitivity analysis, methodologies, assumptions, models, outputs and inputs, and four or five parameters for every sector.

Stefan Vögele, Systems Analysis and Technology Evaluation, Germany, presented on the IKARUS model used by Germany in developing emissions projections and estimating impacts of present and future policy measures. He pointed to difficulties in comparing results between simulation and optimization models employed by different countries, and underlined the importance of developing common approaches to modeling.

In the discussion that followed, the EC acknowledged the difficulty of developing a model that would be acceptable to all countries, but noted that common methods could be developed for use in different models. Slovenia emphasized the importance of diverse modeling approaches, but said ideas and knowledge could be exchanged to get better results. Norway suggested that a model could be developed for use by the UNFCCC to generate comparable data for Parties and for comparison with the results arrived at by countries using different modeling techniques. The EC said a similar approach was used within the EU, where a common model is applied to data from Member States, in addition to projections at the national level. The Royal Society for the Protection of Birds (RSPB) called for greater acknowledgement of the flaws and shortcomings of projection models.

Neil Ferry, Australian Greenhouse Office, elaborated on key features of Australian emissions projections. He said Australia employs multiple models for key sectors, including a combination of bottom-up and top-down models. He explained that the purpose of this is to reflect the diversity that exists as a result of different views on key variables among modeling groups, but noted diffi-



culty in reconciling different model results. He highlighted the importance of stakeholder involvement. Ferry said that Australia does “with measures” but not “with additional measures” scenarios. He pointed to the difficulties in estimating impacts of policy measures, and said policy modeling is done using separate models.

Highlighting the different results, Germany asked how the “correct” projection is assessed. Ferry said only averages of top-down and bottom-up models are carried out. China asked whether the driving forces in different models are compared, and Ferry said this is now being done. Chair Ziesing asked whether discussions with stakeholders influence the results, and whether this improves the quality of the projections. Ferry said stakeholder consultations influence the reports, and models can now be adjusted according to stakeholder comments. He expected the quality of projections to improve.

Erik Rasmussen, Environmental Protection Agency, Denmark, outlined his country’s experience with emissions projections. He showed differing results from previous and updated inventories and differences in projections between 1990 and 2004 due to changes in methodologies and emission factors. Noting Denmark’s role in energy export and expectations of increased investment in wind turbines, Rasmussen emphasized the need to take Protocol-related activities, climate variability, and investment in capacity development into account in modeling projections.

Christo Christov, Energy Institute, Bulgaria, presented the challenges faced by Bulgaria in projecting emissions. He noted his government’s lack of involvement in emissions projections, as a result of Bulgaria’s excess of assigned emissions units. He pointed to several problems in projecting emissions, including:

- the use of old methodologies due to lack of capacity;
- privatization of industry;
- experts from relevant ministries are not connected with reporting on, and control and planning of, sectoral activities; and
- lack of capacity to forecast the development of industry and services.

Highlighting needs, Christov urged the improvement of government capacity to project the development of economic sectors, along with capacity to develop, assess and implement effective P&Ms. He also underlined the need for models to forecast emissions from transport and agricultural activities.

DISCUSSION ON WORKING PAPER 1: Participants addressed the questions raised in Working Paper 1 on general and cross-cutting issues by addressing each one separately. Chair Ziesing requested participants to identify any additional issues requiring discussion. Saudi Arabia suggested addressing the modeling of impacts of response measures and the spill-over effect of Annex I mitigation on developing countries.

Chair Ziesing pointed to questions raised in Working Paper 1 on methodological issues regarding recommendations on different scenarios. He requested participants’ views on whether all Parties should prepare scenarios “without measures,” “with measures” and “with additional measures.” The US noted problems with defining climate policies, and whether these include other non-climate environmental policies that also reduce greenhouse gas emissions. She observed that reporting “with additional measures” was politically sensitive.

The EC encouraged the calculation of “with additional measures” scenarios and noted the difficulty of preparing “without measures” scenarios. Germanwatch said “with additional

measures” scenarios may be necessary for Parties to develop in order to identify how to meet their emissions reduction targets. Chair Ziesing suggested that comparing “with measures” and “with additional measures” scenarios would indicate how Parties could meet their reduction targets. Argentina questioned the meaning of “without measures” scenarios, and suggested that if “with measures” scenarios are business as usual, then “with additional measures” represents a mitigation scenario. The RSPB pointed to situations where non-climate policy measures have secondary effects of reducing emissions. Ireland suggested that non-environmental policies should also be included, pointing to agricultural policies that also reduce greenhouse gas emissions as an example. The EC stressed the importance of considering both climate change policies and other policies that reduce emissions, in order to see what further measures could be taken to reach the emissions reduction targets. Denmark highlighted the distinction between policies and measures, suggesting that only implemented measures should be considered in scenarios. The EC suggested that simultaneous employment of the terms “reference scenario” and “business as usual” and “with measures” was confusing. Chair Ziesing concluded that clear definitions for the different scenario-types are important.

Parties then addressed the incorporation of technological progress into projection modeling and the question of how macroeconomic costs and macroeconomic impacts of climate-related measures have been modeled. On the latter, Germany said that this would depend on the definitions of different scenarios, while Argentina said that different scenarios are not comparable and therefore the costs and impacts are not comparable. China said that the introduction of cost considerations would further complicate the models and questioned how this could contribute to the UNFCCC process. Citing a study using different models including costs with various results proving difficult to interpret, the US preferred not to report macroeconomic costs as part of emissions projections.

Participants discussed whether any particular techniques could be used to integrate cross-country influences and international market developments into national projections. They agreed that this was of greater relevance to some countries than others. Chair Ziesing highlighted the impact of national measures on other countries, based on an earlier intervention from Saudi Arabia.

On methods to assess uncertainty in greenhouse gas projections and improve uncertainty analysis, the EC suggested the development of a list of factors that could enhance uncertainty assessment. Noting that it would be difficult to identify a definite list of parameters, Chair Ziesing suggested that presenting a range of low and high scenarios could improve uncertainty analysis.

On the applicability and comparative advantages of various types of models, Chair Ziesing noted agreement among participants that it is not possible to have a common model, but called for maximum transparency in modeling. Ireland underlined that, while models showing different results are a cause for concern, models that show the same result are not necessarily compatible. Agreeing with Ireland, the Czech Republic pointed out that countries have invested considerable time and effort in developing different models, and should not be asked to change them.

On possible means to facilitate the comparability of national greenhouse gas projections, Germany proposed to recommend a small and robust set of general key assumptions such as world energy prices, population and GDP. Belgium said that GDP was a result of other considerations in his country’s model, while the EC



noted that it did not matter whether GDP was an input or output of the model as long as its origin was clear. China suggested providing more detail, such as information on key assumptions by sector.

On consistent definitions of projection scenarios, participants agreed that workshop recommendations should include providing “with measures” scenarios, as done in most national communications, and requesting the UNFCCC Secretariat to prepare general tables to address present greenhouse gas projections in the national communications.

Regarding consistency with previous greenhouse gas inventories, Chair Ziesing noted that updates in data make it difficult to compare inventories. Austria commented on the convenience of using older finalized data instead of the latest inventory “unfinished” data. The US said that although her country makes yearly methodological and data updates, explaining the resulting inconsistencies to the reviewers does not present a problem.

Participants then addressed questions regarding the availability of information on modeling approaches and key assumptions. The EC said national communications can allow for key assumptions to be outlined, but space limitations mean that assumptions cannot be fully explained. China suggested the publication of a book explaining the projections, in order to provide background on the modeling approaches and key assumptions.

Saudi Arabia highlighted outstanding issues to be addressed, including implementation of win-win P&Ms, assessing socio-economic impacts of P&Ms on developing countries, assessing impacts of P&Ms already implemented, and assessing the spill-over effect of Annex I response measures on developing countries. He stressed that activities related to responses measures, as included in decision 5/CP.7 (implementation of UNFCCC Article 4.8 and 4.9 on adverse effects), should be included in the UNFCCC reporting guidelines for Annex I Parties.

Chair Ziesing and Sergey Kononov recalled that the workshop mandate does not include a discussion on the reporting guidelines. Saudi Arabia pointed to his country’s views as outlined in the workshop submission. Chair Ziesing suggested that another body might address this issue.

SPECIFIC ISSUES RELATING TO ENERGY, INDUSTRY AND WASTE

This session, chaired by Neil Ferry, addressed energy sector projections, including emissions from stationary combustion and transport, industry and waste management.

PRESENTATIONS ON NATIONAL CIRCUMSTANCES:

Francis Altdorfer, ECONOTEC, Belgium, presented an energy demand model using the Emissions Projection Model (EPM), developed by ECONOTEC and used for Belgium’s third national communication. He said energy demand modeling plays a crucial role in Belgium, given limited flexibility in reducing emissions from energy, the complex relationship between economic activity and emissions levels, and the substantial emissions reduction potential with negative cost. These factors require a simulation model that uses a bottom-up disaggregated approach.

Altdorfer said EPM is used to model business as usual scenarios, technical and economic potential, and emissions reduction cost curves, while taking into account, *inter alia*, mitigation measures specific to particular sources and the distribution of costs. Among the challenges, he listed links between bottom-up and macroeconomic modeling, and projecting emissions of fluorinated gases. During the ensuing discussion, China questioned the driving

forces in the service sector that are taken into account, and Altdorfer agreed that this presented a challenge given the variety of activities, and requires further work.

Kejun Jiang, Energy Research Institute, China, presented on the Integrated Policy Assessment Model for China (IPAC), which includes, *inter alia*, models for technology, emissions, power generation and transport. He said common scenarios and parameters are used in the different models to ensure consistency in results. Describing several industrial and transport parameters for China, he said China’s economic target for 2020, which is to quadruple the GDP, is a key driving force. He noted that future challenges include better understanding of the energy production and consumption sectors in China.

Jiri Spitz, ENVIROS, Czech Republic, spoke on methods and models used to project emissions from the energy, transport, industry and waste management sectors in his country. He noted that the energy and industry sectors contribute the greatest portion of greenhouse gas emissions in the Czech Republic and described a linear optimizing and technology-oriented model for projecting emissions. Energy Flow Optimization Model-Environment (EFOM-ENV). He noted that energy demand is calculated by sector and type of energy using a spreadsheet model. Spitz said that mitigation measures are reflected in the model, apart from those in the programmes of the Czech Energy Agency and the State Environmental Fund. He said that realized and planned joint implementation (JI) projects have been taken into account.

Dalia Štreimikiene, Lithuanian Energy Institute, presented the Lithuanian experience in preparing greenhouse gas projections. She explained the lack of “with measures” scenarios in the second national communication, noting that “high” and “low” development scenarios had been presented instead. She emphasized the role of the National Energy Strategy in providing information on mitigation measures for use in scenarios. She said uncertainties in energy projections are related to uncertainties in assumptions, for instance in GDP growth rate and energy efficiency improvements. Štreimikiene said Lithuania has projections for all sectors, and noted that total projections indicate that her country will not have difficulties in meeting the Kyoto emissions reduction target.

In describing the development of “with measures” scenarios, she noted that P&Ms to reduce greenhouse gas emissions are driven by the requirements for EU integration. Štreimikiene said climate change mitigation is the secondary benefit of the P&Ms, but these are nevertheless included in the “with measures” projections because all P&Ms affect greenhouse gas emissions. She said that additional measures include greenhouse gas emissions trading, the EU taxation framework for energy products and JI.

Janis Rekis, Latvian Investment and Development Agency, presented on experiences with greenhouse gas emissions projections for the energy sector in Latvia. He said the process started in 1995, using the MARKAL model (Market Allocations systems engineering model for waste management), employing a bottom-up approach. He presented an overview of the model, and suggested that generic tables for reporting assumptions and results would be useful. Among challenges, he included emission factors for new fuels, lack of an established national system and lack of capacity.

Ton Van Dril, Energy Research Center of the Netherlands (ECN), described the ECN model. He said a bottom-up approach is necessary to project developments in energy consumption in specific sectors. He emphasized the differences between economic and physical growth paths, saying it is important to look at policies



that affect the physical-economic linkages. On energy growth paths, he said both energy efficiency and energy development measures should be considered, since not all development measures are energy efficient. Elaborating on methods to account for ways in which technology penetrates society, he said technologies are not always mature, and are not well known. In addition to these factors, he noted key policy factors that have to be considered while making projections, such as awareness creation, technical and legal possibilities, and incentives, including financial incentives or sanctions.

Among the weaknesses of the bottom-up approach, Van Dril listed the unpredictability of certain trends, limited data sets, data requirements and validation, and awareness and information costs. In the discussion, participants addressed possible institutional arrangements for providing consistent data for use in models, and acknowledged possible problems, such as different exchange rates and different timing for preparing projections in different countries.

Adding to his previous presentation, Stane Merše spoke on modeling approaches applied for the industrial and transport sector in Slovenia. He discussed the inclusion of factors such as best available technologies, on-site energy improvements, fuel switching, and penetration of measures driven by legislation.

Nilgün Egemen, State Institute of Statistics, Turkey, described the projection exercise carried out for the first national communication to be completed later this year. She outlined present and projected energy scenarios for Turkey, noting that the energy sector is the biggest producer of carbon dioxide emissions in Turkey. She said Turkey's Energy and Environment Review has projected emissions and energy demand until 2025, taking into account various factors such as new technologies, the potential for co-generation, and assessments of reduction of transmission and distribution loss. Egemen described assumptions used in alternative scenarios, the results of which demonstrate the importance of, among other things, demand-side management, cogeneration in the industrial sector and improved technological efficiency in the power sector. Emissions projections were also carried out on local pollution scenarios.

Katherine Casey Delhotal, US Environmental Protection Agency (EPA), presented the US approach for projected greenhouse gas emissions. She said the National Energy Modeling System (NEMS) of the Energy Information Administration is used for projecting carbon dioxide emissions based on P&Ms in place as of 1 July 2001, while the EPA has carried out non-carbon dioxide emissions projections. She said the impacts of the National Energy Policy and the Global Climate Change Initiative, which promotes a voluntary approach, were not included in the projections. On uncertainties, she said the EPA does include technologies that are in demonstration, and uncertainties could be caused by, *inter alia*, regulatory and statutory changes that are difficult to model, energy price changes, and the weather.

Replying to a question from Belgium on why a simple method is used to model HFCs, PFCs and sulphur hexafluoride emissions instead of the model used in the projections for ozone depleting substances, Delhotal said the sources are not necessarily similar and that there were difficulties in data collection, as companies are hesitant to divulge proprietary information. In response to a question from China on whether scenarios "with additional measures" will be projected in the future, she said it is unlikely that they will be considered for the fourth national communication, even if there is a change in administration as a result of the Presidential election later this year, since the time would be too brief.

DISCUSSION ON WORKING PAPER 2: Participants discussed questions raised in Working Paper 2 one by one, beginning by exchanging views on modeling energy demand and discussing approaches for projecting changes in the energy supply mix.

The US said that the primary purpose of most energy demand models in her country is to inform energy policy, rather than calculate carbon dioxide emissions projections, making it difficult to provide recommendations on best practices for modeling energy demand. Sergey Kononov raised the issue of overestimates in projections. Germany suggested providing "low" and "high" projections to address this. Bulgaria observed that overestimations may result from the fact that national communications are a communication by governments to the UNFCCC, not a scientific exercise. The Netherlands noted that despite political requirements, expert choices are made with respect to the model results. He suggested considering consistency of assumptions, rather than consistency in models. The RSPB pointed to two sources of uncertainty: in the assumptions entered into models and in the models themselves. The EC said one recommendation could be to create a "pool" of available models to be shared among experts who are fearful of employing these due to lack of experience. China suggested that a common approach could be to have bottom-up models.

Participants then addressed liberalization of energy markets, and whether particular modeling techniques are necessary to reflect this in projections. They deliberated whether and how liberalization is included in models used for the existing national communications, and how to reflect this in neighboring countries with connected economies.

On modeling greenhouse gas mitigation measures particularly relevant to the energy sector, participants highlighted difficulties in defining the baseline for projections. Saudi Arabia suggested recommending efforts to avoid impacts of mitigation measures in Annex I Parties on non-Annex I Parties. Germany pointed out that national models could not account for impacts on other countries, for which bi-national or multinational models are required. Chair Ferry noted that the present workshop did not have a mandate to address the issue, but it would be noted.

On implications of emissions trading and project-based mechanisms on projections, the Netherlands said assumptions about the EU Emissions Trading Scheme and project-based mechanisms are considered in his country's emissions projections. China suggested that countries with experience in including trading mechanisms in projections could report on their experiences for the benefit of other countries. Bulgaria said accounting for trading in projections was a problem for EIT countries, given the lack of information on the willingness of countries to engage in JI projects, and the resulting impact on emissions in EIT countries.

On projections of bunker fuel emissions, the RSPB said that, in some cases, the rise in aviation-related emissions negates the effect of mitigation measures, but countries still do not account for bunker fuel emissions in projections. Saudi Arabia said it was premature to talk about bunker fuel emissions, since no decision had been reached in the negotiations. He called for the inclusion of the impacts of response measures on non-Annex I Parties in the recommendations for modeling transport-related taxation.



Regarding the industry sector, the International Chamber of Commerce said modeling difficulties in calculating and presenting HFCs, PFCs and sulphur hexafluoride emissions are related to the high rate of change in the sector, driven by many concerns, including environmental and macroeconomic concerns.

Saudi Arabia said that it is the use of energy, not supply, that drives emissions.

Bulgaria said supply refers to the mining, delivery, and production of energy.

Chair Ferry said in the case of electricity, it is the supply, not the use, that is the problem. The issue was noted.

SPECIFIC ISSUES RELATING TO AGRICULTURE AND LULUCF

This session was chaired by Micheal Young. Jenny Wong, UNFCCC Secretariat, gave an overview of Working Paper 3 on issues in the preparation of greenhouse gas projections for agriculture and LULUCF. She noted, *inter alia*, that the reporting of projections from LULUCF had been scarce, and that some national communications provide little or no information on the main drivers behind projected emissions from agriculture and LULUCF, thereby reducing the transparency and credibility of projections from this sector. Participants heard presentations and then discussed the Working Paper.

PRESENTATIONS ON NATIONAL CIRCUMSTANCES:

Trevor Donnellan, Rural Economy Research Center, Ireland, presented on greenhouse gas emissions projections from agriculture in his country. He described the models used and emphasized the importance of inputs by national experts and interlinkages within agricultural sectors. He observed that policy models that can form the basis for emissions projections do exist and that agricultural policy alone can have important effects on emissions projections. He also stressed the importance of sensitivity analyses as agricultural prices in the EU move closer to world prices and therefore become more volatile.

In reply to a question, Donnellan said that projections beyond 2010-12 are uncertain. Other questions related to interlinkages and the isolation of agriculture from the rest of the economy in the models, which Donnellan explained as having to do with the size of the sector and its share of the GDP.

Paula Perälä, MTT Agrifood Research, Finland, presented an overview of the emissions scenarios from agriculture presented in her country's third national communication and now in the process of being updated. As the main challenges, she mentioned the need to: further develop models; incorporate important animal categories and crop species; make the models more consistent with Intergovernmental Panel on Climate Change (IPCC) guidelines; include them in the Finnish National System for calculating greenhouse gas inventories; and use them to follow up the implementation of the National Climate Strategy.

Leonard Brown, Climate Change Office, New Zealand, described his country's emissions projections, highlighting the importance of institutional arrangements and links between personnel responsible for inventories and for projections. He described the main drivers of emissions projections from agriculture: animal population by species; productivity and emissions per animal; forecasts for nitrogen fertilizer usage; and P&Ms such as environmental constraints and price measures. He also noted that New Zealand's projections are made only until 2010, after which

there are too many uncertainties. Regarding forestry, he said the models are now being reworked and mentioned the need to refine data.

Questions were raised regarding the effects of carrying capacity, the displacement of sheep farms by dairy farms, accounting for afforestation, reforestation and deforestation under the Protocol Article 3.3, and on the difficulty of calculating forestry growth rates and establishing scenarios.

Steen Gyldenkerne, National Environmental Research Institute, Denmark, presented on Danish emissions projections from agriculture. He gave an overview of the agricultural sector in his country, noting that deforestation is banned and agriculture is highly regulated as a result of nitrogen leeching. He described a module containing an interlinked agricultural inventory as the basis for projections and the use of equilibrium models for calculating future activity. As lessons learned, he mentioned the importance of expert analysis and the need to consider long-term market development.

In the discussion, participants addressed the use of the Monte Carlo model for addressing uncertainties, nitrogen estimates and assumptions about the use of fertilizer, and IPCC default emission factors.

DISCUSSION ON WORKING PAPER 3: Participants discussed the questions raised in Working Paper 3, beginning by addressing key methodological issues for agriculture. Regarding the definition and projection of activity levels and emission factors, participants deliberated approaches for projecting emission factors and the possibility of identifying best practices for such estimates. Participants discussed how sector sensitivity might vary over time. Italy noted the inverse relationship between ammonia production from manure management and methane and nitrous oxide emissions. He suggested a relationship between the UNFCCC and the Convention on Long-Range Transboundary Air Pollution to address this. Participants discussed how to reflect ammonia production in projections, with the EC observing that this data may already be included in information on P&Ms, and thereby included in models.

Participants also deliberated whether emission factors should be kept constant or extrapolated for the purpose of projections, agreeing that where additional information is available, emission factors should not be held constant. They also agreed that where Parties have specific emission factors, these should be applied.

Participants noted that longer-term agriculture models should be encouraged.

They then addressed the use of specialized agriculture models in projections, discussing briefly the New Zealand OVERSEER Nutrient Budget model for estimating nitrous oxide emissions from soil. Participants agreed that recommendations on specialized models are not desirable at this point.

On modeling greenhouse gas-related factors particularly relevant to agriculture, Finland raised the problem of lack of data availability, and suggested improving methodologies for gathering information. Noting that it is more a matter of good organization than lack of data, the Netherlands said detailed statistics, updated every five years, could significantly improve the quality of inventories. The EC pointed to bottom-up approaches for assessing P&Ms, and the Netherlands suggested merging both bottom-up and top-down approaches. Italy proposed improved cooperation between national institutions, possibly through expert groups, to allow more cohesive institutional arrangements.



Participants discussed the UNFCCC guidelines' requirement to present the main drivers of projected emissions from agricultural activities in order to increase the transparency and credibility of projections in the sector. The Netherlands supported the idea of providing an explanation of the drivers, suggesting that the experts who provide the figures could easily add a simple clarification. Among the main factors that influence emissions, Denmark proposed area of occupation, number of livestock, fertilizer application and distribution of manure as general examples. The Republic of Korea added area of rice cultivation. New Zealand suggested referring to the IPCC common reporting format (CRF) tables. Finland called for more information on historical background and linking past and future trends.

Participants then turned to questions on key methodological issues for LULUCF. Chair Young encouraged participants to discuss specific difficulties in presenting LULUCF projections. Participants agreed that producing LULUCF inventory information is challenging enough, and that projections pose an additional burden. New Zealand and Denmark suggested lack of expertise as a challenge to projections. The Netherlands said projections can be based on extrapolation, but this results in high uncertainty. Finland pointed to three challenges: classification of land according to the IPCC categories; difficulties in tracking changes in land use; and assessing the distribution of mineral and organic soils. Other participants observed that their countries had not produced national projections since they await the adoption of the IPCC LULUCF Good Practice Guidance (GPG). Participants agreed to recommend that the GPG form the basis for assessing projections.

Turning to drivers of projected LULUCF emissions, participants addressed whether recommendations could be provided on factors and variables.

Regarding how drivers could best be used to clarify the projected behavior of greenhouse gas emissions and removals from LULUCF, Chair Young suggested that the problem is related to reporting rather than methodologies. Jenny Wong noted that the workshop on fourth national communications, scheduled for 30 September to 1 October 2004, will address the issue from a reporting perspective.

Participants discussed approaches, methods and sources of information and data, commenting that methods used by Parties to report emissions and removals vary, are usually not comparable, and diverge from those used in national inventories. They exchanged views on the relevance of extrapolating emissions and removals and providing alternative approaches. New Zealand noted there are models available that could be used. Finland suggested that agriculture and LULUCF reporting should be more closely linked. Wong noted that in the forthcoming 2006 IPCC guidelines, agriculture will be included with LULUCF.

WRAP-UP DISCUSSION

Facilitators of the groups presented summaries of discussions and recommendations at the conclusion of the workshop.

GENERAL AND CROSS-CUTTING ISSUES: Hans-Joachim Ziesing summarized conclusions and recommendations on cross-cutting and general issues. Referring to the eleven presentations on national circumstances and the related discussions, he noted the value of exchanging experiences. On consistent definitions of projection scenarios, he reported on the recommendation to provide a "with measures" scenario that should be in accordance with the UNFCCC reporting guidelines' definitions. He stressed the importance of having a common understanding of "with

measures" projections. He noted several recommendations regarding the preparation of scenarios: that the "with measures" scenario should include all P&Ms currently in place, whether or not the primary objective is greenhouse gas mitigation; and that Annex I Parties who wish to provide "without measures" and/or "with additional measures" projections should ensure that mitigation P&Ms that are included are clearly identified and that information on how they are modeled is transparent and sufficient.

Ziesing stressed the conclusion that transparency of information is necessary in all aspects of projections. To this end, he said that sectoral and gas-by-gas data should be provided. He noted that the Secretariat had been requested to suggest a template for providing this information, and would present a draft after his presentation.

On consistency with the latest available greenhouse gas inventory, he noted that time-scale presents challenges to assuring such consistency. He said the issue appears less important since no significant inconsistencies are expected, and noted the recommendation that the finalized version of the inventory be used.

Regarding the availability of information on modeling approaches and key assumptions, Ziesing pointed to the discussion on transparency in the presentation of models and projections, which recommended that information on methodologies, models and key assumptions for projections should be provided.

On incorporation of technological progress, he said this is usually done by using exogenous assumptions about changes in model parameters resulting from technological progress. To this end, he noted that methods that represent technological progress endogenously require further research.

On integration of cross-country factors, impacts on other countries, and international market developments into national projections, he said it is not currently possible to assess whether and to what extent such factors are taken into consideration in the preparation of projections. He said that participants recommended that Annex I Parties identify areas of their economy that are potentially affected by such factors and explore what effects the factors will have on greenhouse gas projections.

Regarding methods for assessing the uncertainty in projected emissions, he pointed to sensitivity analysis as the preferred method. He highlighted participants' emphasis on the value of uncertainty analysis and the recommendation that such analysis be an element of greenhouse gas projections. He noted the advantage of using a common set of defined parameters for sensitivity analysis.

On the applicability and comparative advantages of various types of models, Ziesing noted participants' views on the impossibility of indicating the usefulness of individual models for particular aspects of projection modeling due to differing circumstances among countries. To this end, participants felt that use of a single model or a single approach is neither feasible nor useful.

Noting the discussion on possible means to facilitate the comparability of national projections, Ziesing said the availability of information on certain key assumptions could be helpful. He reflected participants' views that using the same data for some parameters, including oil prices on the international market or global macroeconomic trends, may be difficult to implement. On projections of macroeconomic costs and impacts of climate-related measures, Ziesing noted that the UNFCCC guidelines do not require information on such projections, which represent a complex task since results require significant analysis and interpre-



tation. A recommendation is that Annex I Parties wishing to provide such information should also explain the process for estimating the costs and impacts.

Ziesing said that some general and cross-cutting issues had been raised, but not discussed, including methodologies to assess impacts of P&Ms on non-Annex I Parties, noted by Saudi Arabia. He welcomed participants to provide details on Internet addresses for projections, models and methods used in their countries, in order to continue to share knowledge and experiences.

Stelios Pesmajoglou then presented an outline of the template for presenting information on projections, suggesting that projections for all gases be reported for each sector according to the inventory disaggregation of sectors, including emissions in original units and in carbon dioxide-equivalent units. He said the table would be completed for each scenario and projection year. The EC suggested including a list of global warming potentials, thereby eliminating the need to report emissions in original units. Pesmajoglou said reporting on projections is required to be consistent with reporting of P&Ms. Germanwatch suggested requesting Parties to report on international bunker fuel emissions projections as well.

ENERGY, TRANSPORT, INDUSTRY AND WASTE MANAGEMENT: Recommendations and conclusions from discussions on energy, transport, industry and waste management projections were presented by group facilitator Neil Ferry. He said a key outcome is the value of what participants take away from the workshop, and noted that best practices for projections differ from those for inventories.

Summarizing recommendations, he said transparent and clear presentation of assumptions and critical data is as important as the modeling process itself, and it is useful to vary key assumptions and identify sensitivity of projected emissions. He noted the varied views on whether GDP was a variable in itself.

Ferry observed that the choice of models and assumptions was ultimately a matter for governments, but there is a value in deciding "common international assumptions," such as oil prices and carbon prices. Issues such as who should provide this data and its timeliness are still to be considered.

On stationary combustion, Ferry pointed to the recommendation that there is value in consulting with neighbors and discussing "robust and available" models. In the latter case, he reported that there are some concerns about the cost of the models themselves, and of using and adapting them.

On modeling P&Ms, Ferry noted that both endogenous and exogenous approaches are used, and many countries focus on "with measures" and "without additional measures" scenarios for policy choices. Participants agreed on the usefulness of key source and/or driver analysis.

On the inclusion of international emissions trading in projections, he said that participants agreed that trading does not change domestic emissions, but should form part of the analysis of policy choices. He also noted Saudi Arabia's point on the need to model effects of P&Ms on non-Annex I Parties.

Ferry reported that the group agreed that emissions from transport should be reported separately from emissions from the rest of the energy sector, and it was important to model individual transport modes and the selection among modes. On bunker fuels, he reflected the view of participants that it is important to consider these in order to present a complete energy balance, and that there are no methodological problems in modeling projections. He noted the suggestion by Saudi Arabia to consider the impact of emission taxes on non-Annex I Parties.

On the industry and waste management sector, he said participants agreed on the importance of data on activity levels and emission factors, and on presenting results and assumptions clearly. The recommendations include the need for a "reality check" on projections for fluorinated gases to reflect rapid changes in the industry.

AGRICULTURE AND LULUCF: Micheal Young reported on the discussion of the working group on emissions projections from agriculture and LULUCF and highlighted conclusions and recommendations, noting that expertise in the group had been predominantly in agriculture. He began by summarizing discussions on agriculture.

On projections for activity levels and emission factors, Young said that participants agreed to consider possible future changes in emission factors, since these may change as productivity levels change. They also agreed on the significance of providing information on P&Ms to abate ammonia emissions given the synergies between ammonia and nitrous oxide. He said that participants had stressed the emerging importance of sensitivity analysis as the agriculture sector becomes more globalized, involving increased volatility of international exchange rates, which should be factored into the analysis. Regarding the timeframe of projections, he noted that projections are less viable beyond ten years.

On the use of specialized models, he said that, when possible, data and models used in inventories should also be used in projections, and that the focus should be on good scientific practice rather than on models. Accordingly, he said the group did not recommend use of any specialized models, but agreed that a multi-model approach is desirable.

On modeling the impact of greenhouse gas-related factors, Young noted that this data is often not easily factored into a top-down approach, and bottom-up approaches could be used to include P&Ms in the projection models. He observed that the indirect effects of P&Ms are difficult to gauge and noted the usefulness of iteration between models to refine projections.

He said that participants agreed on the importance of presenting the main drivers for emissions projections, since these are not only related to projections but also to the inventory. Young outlined additional recommendations, namely to include a list of emission drivers with reference to the CRF tables, and for Parties to provide a textual interpretation of drivers and context be provided in the national communications.

Young then turned to conclusions and recommendations on LULUCF. Regarding specific difficulties associated with emissions projections for LULUCF, Young said participants noted that forestry projections are available and common in the forestry industry, in contrast to other areas of LULUCF. He said that where inventories are good, projections are not an issue, given that changes in carbon stocks are very low, and therefore investment in specialized models might not be worthwhile. However, he said that participants noted the challenges in tracking changes in land use and in carbon stocks from land-use change, and emphasized that activity data needs to be improved.

On the main drivers behind LULUCF projections, participants agreed on the convenience of deriving a list of variables such as growth rates, tree density and biomass expansion factors, to better guide projections.

In addressing exchange of information on available methods and models, Young noted the need to consider the linkage between agriculture and forestry, and said existing data sets on forest inventories, maps and remote sensing allow for simple extrapolations. He stressed the views of participants on the need for expert opinion



in projection models, and said the application of the GPG will improve inventories, and hence projections. The group was unable to further elaborate on LULUCF projections and provide solutions.

Young reported that participants also discussed institutional arrangements, stressing cooperation between institutions to overcome methodological issues and problems, estimate the effects of P&Ms, and contribute to building projection estimates.

CLOSING REMARKS

Halldór Thorgeirsson thanked participants and facilitators, noting that the report of the workshop will be presented to SBSTA-21 under its own agenda item. He observed that SBSTA is not expected to take much action on the report, since the exchange of information and experiences among participants represents the most significant benefit of the workshop. He recalled that the outcomes of the workshop will feed into the workshop on fourth national communications in Dublin, Ireland, scheduled for 30 September to 1 October 2004. On behalf of SBSTA Chair Benrageb, he then closed the workshop at 11:12 am.

UPCOMING MEETINGS

EMISSIONS MARKETING ASSOCIATION'S EIGHTH ANNUAL FALL MEETING AND CONFERENCE: This conference will take place from 19-22 September 2004, in Toronto, Canada. For more information, contact: David Feldner, EMA Executive Director; tel: +1-414-276-3819; fax: +1-414-276-3349; e-mail: dfeldner@emissions.org; Internet: <http://www.emissions.org/conferences/fallconference04/>

IPCC EXPERT MEETING ON INDUSTRIAL TECHNOLOGY DEVELOPMENT, TRANSFER AND DIFFUSION: This meeting will take place from 21-23 September 2004, in Tokyo, Japan. For more information, contact: IPCC Secretariat; tel: +41-22-730-8208; fax: +41-22-730-8025; e-mail: IPCC-Sec@wmo.int; Internet: <http://www.ipcc.ch/othernews/itdt.htm>

UNFCCC WORKSHOP ON THE PREPARATION OF THE FOURTH NATIONAL COMMUNICATIONS BY ANNEX I PARTIES: This workshop will be held from 30 September to October 2004, in Dublin, Ireland. For more information, contact UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; email: secretariat@unfccc.int; Internet: <http://unfccc.int/sessions/workshop/300904/index.html>

EXPERT WORKSHOP ON GREENHOUSE GAS EMISSIONS AND ABRUPT CLIMATE CHANGE – POSITIVE OPTIONS AND ROBUST POLICY: This meeting will take place from 30 September to 1 October 2004, in Paris, France. For more information, contact Peter Read, Workshop Convener; tel: +64-6-350-5972; fax: +64-6-350-5660; e-mail: pread2@attglobal.net; Internet: <http://www.acestrategy.org/>

THIRD INTERNATIONAL SYMPOSIUM - ENERGY AND ENVIRONMENT 2004: This symposium will be held from 30 September to 2 October 2004, in Sorrento, Italy. For more information, contact: Megalia Foundation; tel: +39-81-665-815; fax: +39-81-240-4219; e-mail: megalia.eco@tiscali.it; Internet: <http://www.megaliafoundation.it/Sorrento/>

SECOND SESSION OF THE PREPARATORY COMMITTEE FOR THE WORLD CONFERENCE ON DISASTER REDUCTION: The preparatory committee for the World Conference on Disaster Reduction, which is scheduled to take place in January 2005, in Kobe-Hyogo, Japan, will convene for its second session from 11-12 October 2004, in Geneva,

Switzerland. For more information, contact: UN/ISDR; tel: +41-22-917-2529; fax: +41-22-917-0563; e-mail: isdr@un.org; Internet: <http://www.unisdr.org/eng/wcdr/wcdr-index.htm>

WORKSHOP ON TRANSPORTATION AND CLIMATE CHANGE: This workshop will be held from 12-13 October 2004, in Baltimore, Maryland, US. For more information contact: Tim Stileman, IPIECA; tel: +44-20-7633-2388; fax: +44-20-7633-2389; e-mail: tim.stileman@ipieca.org; Internet: http://www.ipieca.org/downloads/climate_change/TCC_Workshop/Information.pdf

CLIMATE CHANGE AND BUSINESS CONFERENCE AND EXPO 2004: This conference will be held from 3-5 November 2004, in Auckland, New Zealand. For more information, contact: The Conference Company Ltd; tel: +64-9-360-1240; fax: +64-9-360-1242; e-mail: secretariat@climateandbusiness.com; Internet: <http://www.climateandbusiness.com>

22ND SESSION OF THE IPCC: This meeting of the Intergovernmental Panel on Climate Change will take place from 8-11 November 2004, in New Delhi, India. For more information, contact: IPCC Secretariat; tel: +41-22-730-8208; fax: +41-22-730-8025; e-mail: IPCC-Sec@wmo.int; Internet: <http://www.ipcc.ch>

EMA EMERGING MARKETS CONFERENCE – EMISSIONS & RENEWABLES: This conference will be held from 14-17 November 2004, in Houston, Texas, US. For more information contact: David Feldner, EMA Executive Director; tel: +1-414-276-3819; fax: +1-414-276-3349; e-mail: dfeldner@emissions.org; Internet: <http://www.emissions.org/conferences/houston04/>

GEF NGO CONSULTATION AND COUNCIL MEETING: This meeting will take place from 16-19 November 2004, in Washington, DC, US. For more information, contact: the GEF Secretariat; tel: +1-202-473-0508; fax: +1-202-522-3240; e-mail: secretariat@TheGEF.org; Internet: http://gefweb.org/participants/Council/Meeting_Schedule/meeting_schedule.html

16TH MEETING OF THE PARTIES TO THE MONTREAL PROTOCOL (MOP-16): MOP-16 to the Montreal Protocol will convene from 22-26 November 2004, in Prague, the Czech Republic. For more, information, contact: Ozone Secretariat, UNEP; tel: +254-2-62-3850; fax: +254-2-62-3601; e-mail: ozoneinfo@unep.org; Internet: <http://www.unep.org/ozone>

TENTH CONFERENCE OF THE PARTIES TO THE UNFCCC (COP-10): UNFCCC COP-10 will be held from 6-17 December 2004, in Buenos Aires, Argentina. For more information, contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; email: secretariat@unfccc.int; Internet: <http://www.unfccc.int>