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**SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE**  
Twenty-third session  
Montreal, 28 November to 6 December 2005

**Item 4 of the provisional agenda**  
**Scientific, technical and socio-economic aspects of mitigation of climate change**

**Summary report on topics covered at the workshops on mitigation  
of climate change**

**Note by the secretariat**

*Summary*

After considering the Third Assessment Report of the Intergovernmental Panel on Climate Change, the Subsidiary Body for Scientific and Technological Advice (SBSTA), at its eighteenth session, decided to initiate work on two new agenda items: scientific, technical and socio-economic aspects of impacts of, and vulnerability and adaptation to, climate change; and scientific, technical and socio-economic aspects of mitigation. To facilitate its consideration of these agenda items, the SBSTA conducted three in-session workshops on mitigation, one each at SBSTA 20, 21 and 22, and a pre-session workshop before SBSTA 19.

The SBSTA, at its twenty-second session, requested the secretariat to prepare a concise report on the topics presented at the in-session workshops held to date.

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## **I. Introduction**

### **A. Mandate**

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA), at its twenty-second session, requested the secretariat, under the guidance of the Chair of the SBSTA, to prepare a concise report on the topics presented at the in-session workshops on mitigation of climate change held to date (FCCC/SBSTA/2005/4, para. 21). It further indicated that the report should cover the greenhouse gases (GHGs), sectors, technologies, regions and socio-economic aspects and other related factors addressed.

### **B. Scope of the note**

2. In accordance with the above mandate, this document provides a summary of the topics covered in the three in-session workshops on mitigation, which were held at SBSTA 20, 21 and 22, and covers presentations on mitigation made at a pre-session workshop held before SBSTA 19 (which also covered adaptation). The paper does not attempt to analyse the presentations, or encapsulate any views or lessons learned. Rather, it simply provides an overview of the main topics and issues presented. Complete presentations and summaries by the chairs of the workshops can be found on the UNFCCC web site.<sup>1</sup>

3. All workshops were organized by the UNFCCC secretariat, at the request of the SBSTA, and took into account the issues and priorities identified by Parties in relevant submissions. The in-session workshops were also organized under the guidance of the SBSTA Chair. An overview of the workshops and topics is presented in chapter II. The annex contains a table of topics and issues raised.

### **C. Possible action by the Subsidiary Body for Scientific and Technological Advice**

4. Parties may wish to consider the information presented in this document in preparing their views on lessons learned from the mitigation workshops held to date and on any future steps under this agenda item, for submission to the secretariat by 5 August 2005.

## **II. Topics covered at the workshops**

5. After considering the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), the SBSTA, at its eighteenth session, decided to initiate work on two new agenda items: scientific, technical and socio-economic aspects of impacts of, and vulnerability and adaptation to, climate change; and scientific, technical and socio-economic aspects of mitigation. To facilitate consideration of these issues, the SBSTA requested the secretariat to organize a pre-session consultation before SBSTA 19 with participation of the IPCC and practitioners, such as representatives of industry, local government, and non-governmental organizations (NGOs). At this workshop, one panel was organized on mitigation. Presenters addressed experiences, success stories and barriers to implementation, together with technological development and main drivers, and other issues relevant for consideration by the SBSTA.

6. The Conference of the Parties, by its decision 10/CP.9, requested the SBSTA, at its twentieth session, to initiate work on scientific, technical and socio-economic aspects of impacts of, and vulnerability and adaptation to, climate change, and on scientific, technical and socio-economic aspects of mitigation, and to focus on exchanging information and sharing experiences and views among Parties on practical opportunities and solutions to facilitate the implementation of the Convention.

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<sup>1</sup> <[http://unfccc.int/methods\\_and\\_science/mitigation/items/2728.php](http://unfccc.int/methods_and_science/mitigation/items/2728.php)>.

7. The themes of the first in-session workshop on mitigation, held at SBSTA 20, were sustainable development, opportunities and solutions, and vulnerability and risk as they relate to mitigation of climate change. The workshop was organized around three panels, all of which focused on the energy and agriculture sectors:

- (a) The relationship between climate change mitigation and other policy and development objectives (e.g. economic growth and development, employment, energy and food security, spillover effects)
- (b) Case studies of mitigation: costs and benefits, including co-benefits, and options for minimizing costs and maximizing benefits
- (c) Climate mitigation and new technologies: what spurs technological innovation? Case studies of technology development and potential.

8. The secretariat was requested to organize a second workshop at SBSTA 21. The purpose of this workshop was to exchange information and share experiences and views on the following:

- (a) Mitigation technology innovation, deployment and diffusion, including identification and removal of barriers
- (b) Practical opportunities and solutions for mitigation that contribute to sustainable development.

9. A third in-session workshop was held at SBSTA 22. This workshop focused on the following topics:

- (a) Factors that affect mitigation technology innovation, deployment and diffusion, including international cooperative efforts, and identification and removal of barriers
- (b) Socio-economic aspects of mitigation, such as costs and benefits, co-benefits, poverty reduction and economic impacts, including spillover effects.

10. Due to time limitations and the broad scope of the subject, it was not possible to cover any of the mitigation issues in depth. Rather, the secretariat, under the guidance of the Chair, sought to provide a broad overview of the scientific, socio-economic and technical aspects of mitigation, and to represent a wide and diverse range of perspectives.

11. Presenters were drawn from Parties and included experts and practitioners in the field. Participants represented governments at the national and sub-national levels, industries, international organizations, and research and environmental NGOs.

12. In total, 38 presentations<sup>2</sup> were made on scientific, technical and socio-economic aspects of mitigation of climate change. Five presentations addressed mitigation from a global perspective, e.g. looking at the global potential for mitigation or technology innovation; the remaining presentations focused on specific geographic regions or countries. Of these, 10 covered Latin America, 8 covered Africa, and 11 Asia. Fifteen presenters were from developing countries.

13. Workshop presentations covered a number of GHG emitting sectors. Due to the interests identified by Parties in their submissions,<sup>3</sup> more than half of the presentations addressed mitigation issues

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<sup>2</sup> Because several presentations covered multiple regions, the numbers that follow do not add up to 38.

<sup>3</sup> FCCC/SBSTA/2004/MISC.6 and Add.1, FCCC/SBSTA/2004/MISC.13 and Add.1, and FCCC/SBSTA/2005/MISC.2 and Add.1-2.

relating to energy. These included opportunities for mitigation in energy supply, e.g. renewable energy, combined heat and power, and opportunities to improve the efficiency of energy use in the transport, residential and industrial sectors. Agriculture was also covered in some depth, due in large part to the important role of agriculture as a sustainable development concern in developing countries. Mitigation options in the waste sector, and through carbon dioxide capture and geological storage, were also addressed.

14. Participants at the workshops identified and discussed a number of socio-economic aspects of mitigation. These included energy security, electrification, economic development, poverty reduction and employment, health and local environmental benefits, financing and capacity-building needs and barriers to implementing mitigation options at the national and local level. In addition, the spillover effects on developing countries of mitigation activities in developed countries were also explored.

15. As the workshops evolved, the SBSTA requested an increasing focus on technology, in particular the factors influencing, and barriers to, technology development, deployment and diffusion. In addition to specific technologies, such as hydrogen power and clean coal, presentations explored the potential of current and emerging technologies to achieve reduction in GHG emissions. Several presentations also addressed the policies and factors influencing technology innovation, deployment and diffusion, such as international cooperation. Many other presentations identified the barriers to technology innovation and application as part of their consideration of specific mitigation options.

16. A table summarizing the topics covered by the workshops is contained in the annex. It is based on a review of the written presentations only. Therefore, the summaries may not reflect comprehensively the points raised in the presentations; nor do they include any issues arising from questions and discussions. References to specific technology have been included only where a presentation explicitly focused on a specific technology.

Annex

**Topics on mitigation presented at four workshops conducted by the Subsidiary Body for Scientific and Technological Advice**

<b>Title</b>	<b>Speaker and organization</b>	<b>Sector</b>	<b>Gas</b>	<b>Region covered</b>	<b>Technology</b>	<b>Socio-economic aspects</b>	<b>Mitigation action</b>
<b>SBSTA 19 Pre-sessional consultations on the Third Assessment Report of the Intergovernmental Panel on Climate Change</b>							
Local authorities and climate protection	Ms. Gotelind Alber, Climate Alliance (Germany)	Residential energy efficiency, transport	CO <sub>2</sub>	Western Europe and Other		Energy savings, local environmental benefits, technical and financial barriers	Local initiatives, international cooperation
Economic growth and greenhouse gas emissions: opportunities to split the trends	Ms. Annie Petsonk, Environmental Defense (United States of America)			Global		Economic growth	Emissions trading, and others
Lafarge and climate change	Mr. Christopher Boyd, Lafarge (Italy)	Cement industry	CO <sub>2</sub>	Western Europe and Other		Economic efficiency	Voluntary industry initiative
Climate change mitigation and human development. Goals: reconciliation not confrontation	Mr. Jiahua Pan, Research Centre for Sustainable Development (China)	Energy use, industry	CO <sub>2</sub>	Asia		Economic development, competing development priorities, technical and financial barriers	International technology cooperation, non-specific
Local community initiatives in mitigating climate change and promoting sustainable development	Mr. Patrik Karani, Bureau of Environmental Analysis (Kenya)	Agriculture	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	Africa		Rural development, other local environmental benefits, technical, financial and institutional barriers	Carbon sequestration and carbon offsets
A successful worldwide voluntary approach to mitigation	Mr. Jerry Marks, Global Aluminium Sustainable Initiative (United States)	Aluminium industry	CO <sub>2</sub> , HFCs, PFCs	Western Europe and Other		Energy savings	Voluntary industry initiative

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Climate change, innovation and the fossil fuel industries – insights from United Kingdom experience and links to the IPCC Third Assessment Report	Mr. Michael Grubb, The Carbon Trust (United Kingdom of Great Britain and Northern Ireland)	Energy supply	CO <sub>2</sub>	Western Europe and Other	Wind	Energy security, regulatory and institutional barriers	Renewable portfolio standards, technology subsidies, emissions trading, energy efficiency measures
Underground storage of CO <sub>2</sub> – experience and outlook	Mr. Tore Torp, Statoil (Norway)	Carbon storage	CO <sub>2</sub>	Western Europe and Other	CO <sub>2</sub> capture and geological injection	Political and social uncertainty	Research and development
Energy efficiency for climate change mitigation	Mr. Zdravko Genchev, EnEffect (Bulgaria)	Energy efficiency	CO <sub>2</sub>	Eastern Europe		Energy savings, technical and financial barriers, underdeveloped markets	District heating, municipal lighting and buildings
Sustainable development evaluation from climate change mitigation options – the case of renewable energies	Mr. Jose Moreira, Brazilian National Reference Center on Biomass (Brazil)	Renewable energy, transport	CO <sub>2</sub>	Latin America and the Caribbean		Rural development, energy security, employment, political uncertainty, financial barriers	Demonstration projects, technology subsidies, other
<b>SBSTA 20 In-session workshop on mitigation</b>							
Energy sector development and climate mitigation	Mr. Ajay Mathur, Senergy Global (India)	Energy	CO <sub>2</sub>	Latin America and the Caribbean, Africa, Asia		Economic productivity, energy supply and environmental quality, financial, technical and technological barriers	International cooperation in energy efficiency and technologies
Greenhouse gas mitigation as a tool for sustainable rural development: linking international action on climate change, hunger and poverty, and environmental conservation	Ms. Sara J. Scherr, Forest Trends (United States)	Agriculture	CO <sub>2</sub>	Latin America and the Caribbean, Africa, Asia		Rural development, food security, local environmental benefits, financial and information barriers	Investments in the land use, land-use change and forestry sector (clean development mechanism), integration of carbon mitigation strategies into national planning

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Energy development in China from a viewpoint of sustainable development	Mr. Yang Hongwei, China Energy Research Institute (China)	Energy	CO <sub>2</sub>	Asia		Energy security, local environmental benefits, competing development priorities	Energy conservation policies and standards, promotion of renewable energy
Greenhouse gas mitigation and energy policy: a European perspective	Mr. Christobal Burgos, European Commission, Directorate General for Energy and Transport (Belgium)	Energy	CO <sub>2</sub>	Western Europe and Other		Energy security, local environmental benefits, regulatory and institutional barriers, competing policy priorities	Renewable portfolio standards, energy efficiency standards, emissions trading, research and development, international cooperation
Climate change mitigation policy for agriculture in Canada: horizontal policy integration	Mr. Bob MacGregor, Agriculture and Agri-Food (Canada)	Agriculture	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	Western Europe and Other		Local environmental benefits, decreased resource use	Farm conservation plans, research and development financing, carbon sequestration, offset credit system, education and public outreach
Experiences with renewable and energy efficiency projects in Africa	Mr. Stephen Karakezi, African Energy Policy Research Network (Kenya)	Renewable energy	CO <sub>2</sub>	Africa	Geothermal, biomass-based co-generation, small-scale renewables	Employment, energy reliability, financial and technological barriers, integration in national planning	Demonstration projects
Improving rural livelihoods and the global environment through agricultural intensification: a case study from Latin America	Mr. Marco Antonio Rondon, Centro Internacional de Agricultura Tropical (Colombia)	Agriculture	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O,	Latin America and the Caribbean		Carbon sequestration, local environmental benefits, increased food production	Demonstration projects



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Case studies of district heating in Russia	Mr. Igor Bashmakov, Center for Energy Efficiency (Russian Federation)	District heating	CO <sub>2</sub>	Eastern Europe	Combined heat and power	Energy security, economic development; political, regulatory and economic barriers	Energy efficiency standards for buildings
Greenhouse gas mitigation options from rice fields	Ms. Sirin Towprayoon, King Mongkut's University of Technology (Thailand)	Agriculture	CH <sub>4</sub>	Asia	Rice production practices	Labour and resource costs, crop yield, financial and information barriers	Alternative management practices for rice production
Technology innovation for climate mitigation and its relation to government policies	Mr. Edward Rubins, Carnegie Mellon University (United States)	Energy supply, energy efficiency, carbon capture and storage	CO <sub>2</sub>	Western Europe and Other, Global			Various technology policies and environmental regulatory policies
Technology innovation and potential in agriculture	Ms. Bettina Hedden-Dunkhorst, Center for Development Research, University of Bonn (Germany)	Agriculture	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	Africa, Latin America and the Caribbean, Asia	Land management practices (rice, wheat, pasture)	Agricultural productivity, local environmental benefits, rural development, financial and institutional barriers	Alternative management practices, international cooperation, education
Rural energy development in Latin America	Mr. Teodoro Sanchez-Campos, Intermediate Technology Development Group (Peru)	Renewable energy	CO <sub>2</sub>	Latin America and the Caribbean	Small-scale electricity generation: hydroelectric, wind, photovoltaics, and biomass	Rural electrification, financial, technical and institutional barriers	International cooperation and financing
The contribution of photovoltaic systems to reduction of CO <sub>2</sub>	Mr. Takashi Tomita, Sharp Corporation (Japan)	Renewable energy	CO <sub>2</sub>	Asia	Photovoltaics	Rural electrification, local environmental benefits, financial and informational barriers	Renewable energy policies
A pathway to non-CO <sub>2</sub> mitigation discovery for pastoral agriculture in New Zealand	Mr. Gerald Rys, New Zealand Ministry of Forestry and Agriculture (New Zealand)	Agriculture	CH <sub>4</sub> , N <sub>2</sub> O	Western Europe and Other	Feed additives, land management	Agricultural productivity, other environmental benefits	Government-industry partnerships

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<b>SBSTA 21 In-session workshop on mitigation</b>							
Mitigation opportunities in the waste sector in Argentina	Mr. Hernan Carlino, Ministry of Environment and Sustainable Development (Argentina)	Waste	CH <sub>4</sub>	Latin America and the Caribbean	Methane capture	Urban health and environmental benefits, energy recovery, institutional and legal barriers, costs	Waste management
Can coal contribute to sustainable development?	Ms. Christine Copley, World Coal Institute (United Kingdom)	Energy	CO <sub>2</sub>	Latin America and the Caribbean, Africa, Asia, Global	Clean coal, CO <sub>2</sub> capture and storage, dual-fuel plants	Energy and economic development, local environmental quality	Public-private cooperation, voluntary action
Hydrogen and fuel cell programs in the United States: perspectives from the United States Department of Energy	Mr. Robert Dixon, United States Department of Energy (United States)	Renewable energy (hydrogen), transport	CO <sub>2</sub>	Western Europe and Other	Hydrogen production and storage, fuel cell vehicles	Energy security, local environmental benefits, economic competitiveness, institutional and legal barriers, lack of public awareness, technological challenges	International cooperation, public-private partnerships, technology polices
Lessons and experiences of implementing energy efficiency programmes to reduce GHG emissions	Mr. Paul Kirai, GEF-KAM National Project Manager (Kenya)	Energy efficiency		Africa		Increased profits, energy savings, poverty reduction, employment, local environmental benefits, financial and institutional barriers	Training, information sharing, demonstration projects
Energy efficiency – Australia's national and bilateral approach	Mr. James Shevlin, Department of the Environment and Heritage and the Australian Greenhouse Office (Australia)	Energy efficiency	CO <sub>2</sub>	Western Europe and Other		Financial and technical barriers	Cooperative initiatives with industry, energy efficiency standards, demonstration projects, labelling

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Stabilization wedges: solving the climate problem for the next 50 years with current technology	Mr. Robert Socolow, Princeton University (United States)	Multiple	CO <sub>2</sub>	Global	Wind, carbon capture and storage, coal gasification, biofuels		Potential greenhouse gas emission reductions that can be obtained in the next 50 years by scaling up currently available technologies and practices.
Use of biofuels in Brazil	Mr. Alfred Szwarc, Consultant to the Ministry of Science and Technology (Brazil)	Renewable energy, transport	CO <sub>2</sub>	Latin America and the Caribbean	Ethanol production, co-generation, dual fuel vehicles, industrial boilers	Energy security, local environmental benefits, employment	Initiatives to promote the development, deployment and diffusion of biofuels, through research and development, target-setting, regulatory measures and other approaches.
<b>SBSTA 22 In-session workshop on mitigation</b>							
Climate change mitigation: the energy technology challenge	Mr. Richard Bradley, International Energy Agency (France)	Energy supply, energy efficiency, carbon capture and storage	CO <sub>2</sub>	Global		Electrification, institutional and legal barriers, lack of public awareness and technical expertise, capital costs, lack of financing	Government procurement, standards, public-private partnerships, international cooperation
Near-term technology policies for long-term climate target – economy-wide versus technology-specific approaches	Mr. Christian Azar, Chalmers University of Technology (Sweden)	Multiple		Western Europe and Other			Regulation, standards, price incentives, targeted research investment

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Barriers to GHG mitigation options in developing economies like Sri Lanka, and strategies to overcome them	Mr. Priyantha Wijayatunga, Public Utilities Commission of Sri Lanka and University of Moratuwa (Sri Lanka)	Energy, renewables, off-grid power		Asia	Small-scale hydro, wind, biomass, liquid natural gas, coal gasification	Electrification, energy reliability, costs, technical, financial and institutional barriers	Energy sector development
Factors that affect innovation, deployment and diffusion of energy efficient technologies: case studies of the Japan iron and steel industry	Mr. Mitsutsune Yamaguchi, Teikyo University (Japan)	Iron and steel industry	CO <sub>2</sub>	Western Europe and Other, Asia	Heat/gas/pressure recovery electricity generation systems: coke dry quenching, top-pressure recovery turbines	Local environmental and health benefits, reduced resource use, energy security, financial, informational and institutional barriers	Demonstration projects, training
EPA's integrated environmental strategies programme	Mr. Luis Cifuentes, Catholic University (Chile)	Transport, energy efficiency	CO <sub>2</sub>	Latin America and the Caribbean, Asia		Local environmental and health benefits competing policy objectives, lack of technical expertise and awareness, difficulty in quantifying benefits	Modeling tools and assessment methodologies
Does the choice of policy measures in Annex B countries influence impacts on non-Annex B countries?	Mr. W. David Montgomery, Charles River Associates (United States)	Multiple, transport	CO <sub>2</sub>	Global		Reduced income and exports, changes in terms of trade, decrease in energy exports and prices	Cross-cutting, cap and trade, fiscal policy, standards
Doing GHG mitigation in the South – co-benefits from hands-on learning-by-doing experiences	Mr. Steve Thorne, SouthSouthNorth (Africa): (South Africa)	Residential energy, renewables, waste	CO <sub>2</sub> , CH <sub>4</sub>	Africa		Rural electrification, local environmental benefits, poverty reduction, employment institutional framework (clean development mechanism), lack of technical expertise and awareness	Clean development mechanism