



**UNITED
NATIONS**



**Framework Convention
on Climate Change**

Distr.
GENERAL

FCCC/SBSTA/2007/INF.3
1 November 2007

ENGLISH ONLY

SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE

Twenty-seventh session

Bali, 3–11 December 2007

Item 10 of the provisional agenda

Scientific, technical and socio-economic aspects of mitigation of climate change

Information presented by Parties during the workshops on mitigation

Note by the secretariat

Summary

In response to a request by the Subsidiary Body for Scientific and Technological Advice (SBSTA), at its twenty-third session, the secretariat organized four workshops in 2006 and 2007, which addressed scientific, technical and socio-economic aspects of mitigation of climate change. The themes of the workshops were: agriculture, forestry and rural development; urban planning and development, including transportation; energy efficiency, including industry, and residential and commercial end-use; and power generation, including clean fossil fuels and renewable energy.

This document was prepared in response to a request by the Chair of the SBSTA to the secretariat to provide, prior to SBSTA 27, input for deliberations by Parties based on the information presented by Parties during the mitigation workshops. The document attempts to summarize the information presented during the four workshops that have been organized by the secretariat thus far. The SBSTA may wish to consider the information in this note during its deliberations under this agenda item at its twenty-seventh session.

CONTENTS

	<i>Paragraphs</i>	<i>Page</i>
I. INTRODUCTION	1–5	3
A. Mandate	1–3	3
B. Scope of the note	4	3
C. Possible action by the Subsidiary Body for Scientific and Technological Advice	5	4
II. SUMMARY OF THE INFORMATION PRESENTED AT THE WORKSHOPS.....	6–29	4
A. Agriculture, forestry and rural development	7–14	4
B. Urban planning and development, including transportation ..	15–19	5
C. Energy efficiency, including industry, and residential and commercial end-use	20–25	6
D. Power generation, including clean fossil fuels and renewable energy	26–29	7

I. Introduction

A. Mandate

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA), at its twenty-third session,¹ agreed to continue its work on the 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 as mandated by decision 10/CP.9. The SBSTA requested the secretariat to organize workshops at each of its next four sessions, on the following themes:

- (a) Agriculture, forestry and rural development;
- (b) Urban planning and development, including transportation;
- (c) Energy efficiency, including industry, and residential and commercial end-use;
- (d) Power generation, including clean fossil fuels and renewable energy;
- (e) Non-CO₂ emissions, including methane recovery and utilization.

2. At the same session,² the SBSTA recommended that each workshop should address the following aspects, taking into account ongoing work under the agenda item on development and transfer of technologies, including the work of the Expert Group on Technology Transfer (EGTT):

- (a) Currently available and emerging technologies, including small-scale mitigation technologies, and associated emission reduction potential; opportunities and best practices to overcome barriers to, and factors that promote, innovation, deployment, transfer and diffusion of these technologies, including through innovative financing;
- (b) International cooperative efforts to promote technology innovation, deployment, transfer and diffusion, and opportunities to enhance such cooperation;
- (c) Socio-economic aspects of mitigation, such as costs and benefits, co-benefits, spillover effects and “win-win” practices that contribute to sustainable development;
- (d) Cross-cutting aspects and methods and tools for assessing mitigation opportunities.

3. At the twenty-fourth session of the SBSTA,³ in order to facilitate the discussion at its twenty-seventh session, the Chair requested the secretariat to provide, prior to SBSTA 27, input for deliberations by Parties based on the information presented by Parties during the mitigation workshops.

B. Scope of the note

4. This note has been prepared in response to the request by the Chair of the SBSTA mentioned in paragraph 3. It attempts to summarize the information presented during the four workshops that have been organized by the secretariat thus far⁴ taking into account the observations by the Chair of the

¹ FCCC/SBSTA/2005/10, paragraph 26.

² FCCC/SBSTA/2005/10, paragraph 27.

³ FCCC/SBSTA/2006/5, paragraph 109.

⁴ The fifth and final workshop will be organized as an in-session workshop at SBSTA 27.

SBSTA that were included in his oral reports at SBSTA 24 and SBSTA 26. All presentations at the four workshops are available on the UNFCCC website.⁵

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

5. The SBSTA may wish to consider the information in this note during its deliberations on this issue at its twenty-seventh session.

II. Summary of the information presented at the workshops

6. The presenters at the first four workshops addressed a wide range of issues relating to agriculture, forestry and rural development; urban planning and development, including transportation; energy efficiency, including industry, and residential and commercial end-use; and power generation, including clean fossil fuels and renewable energy. The presentations covered economic aspects of climate change mitigation options; associated costs and co-benefits; the role of policies, markets, technology and needs; and how mitigation action in various sectors could contribute to sustainable development taking into account different national circumstances. It was also mentioned that analysis of the socio-economic impacts of mitigation options should take into consideration possible spillover effects.

A. Agriculture, forestry and rural development

7. Agriculture and forestry are important for the sustainable development of communities and the national economies of all countries. Both sectors provide a large part of the livelihood of local communities and contribute to efforts to promote food security and poverty alleviation. At the same time, they are responsible for significant amounts of greenhouse gas (GHG) emissions. The presentations focused on mitigation options for both sectors, including on how such options can contribute to the promotion of sustainable forest management and on the role of carbon sequestration.

8. The importance of agriculture in terms of its contribution to GHG emissions was emphasized by a number of presenters. In China, about 70 per cent of the population lives in rural areas and the agriculture sector accounts for a large share of total GHG emissions; for example, China's nitrogen fertilizer consumption in 2004 accounted for 30 per cent of the world's total consumption, and its areas of rice planting and year-end stocks of pigs accounted for 19 per cent and 50 per cent, respectively, of the world totals. In Australia, the agriculture sector accounts for approximately 18 per cent of total national GHG emissions. Given the growth of the rural economies, improvements to living standards and the projected increase in global demand because of global population growth, emissions from agriculture are expected to continue to increase.

9. The forestry sector is equally important in terms of its contribution to the national economy and to the economies of local communities, primarily in developing countries. Forest ecosystems have a unique environmental role as they are responsible for both emissions and removals of carbon dioxide (CO₂). In addition, carbon sequestration activities, through the protection of forest areas, have important co-benefits in terms of improvements in water quality, reducing the risk of loss of biodiversity, flood control, and combating land degradation and desertification.

10. For both sectors there are opportunities to reduce GHG emissions as part of global mitigation efforts while at the same time contributing to rural development. Some presenters mentioned that

⁵ <<http://unfccc.int/meetings/sb24/in-session/items/3647.php>>,
 <http://unfccc.int/methods_and_science/mitigation/items/3972.php>,
 <http://unfccc.int/methods_and_science/mitigation/items/3974.php>,
 <http://unfccc.int/methods_and_science/mitigation/items/3973.php>.

interlinkages exist between the agriculture and forestry sectors and that the implementation of policies and measures in one sector can impact on the other. In this regard, some speakers pointed out that an integrated or holistic approach would be needed when dealing with both these sectors. Furthermore, it was mentioned that there are further interlinkages between mitigation efforts and adaptation actions in both sectors, and it was proposed that mitigation and adaptation efforts should be integrated into countries' development objectives.

11. For the agriculture sector, a number of mitigation options were presented. One group of options, which are considered to be promising in terms of GHG reduction potential, includes agricultural management practices (e.g. croplands, rice paddies, agro forestry), that aim at reducing the release of methane (CH₄), improving efficiency of nitrogen fertilization and increasing the potential for soil carbon sequestration in soils. In addition, the rehabilitation of severely degraded lands, building soil carbon by, for example, conservative tillage and improved vegetation management, can be effective ways of reducing CO₂ emissions. Another group of options focuses on reducing GHG emissions from livestock, mainly methane (CH₄) emissions from ruminants. Current efforts focus on animal and microbial genetics, alternative animal nutrition, and supplements to modify rumen microflora and animal output. Other mitigation options with large expected potential include the production of bio-energy (biofuel, biogas), such as CH₄ capture, the use of biomass and biogas digesters, and increasing fuel and energy efficiency for agricultural equipment. For some of these options, however, further research is required.

12. For the forestry sector, mitigation options comprise the sustainable management of forests (including enhanced reforestation and afforestation, and reducing deforestation), the rehabilitation and conservation of peatlands, and controlling forest fires to increase soil carbon. Other options include the development of GHG sink/source control technologies through conservation and the efficient management of terrestrial ecosystems. Examples of such activities include source/sink control in tropical peat swamps, afforestation in tropical forests and arid lands, and mitigation of CH₄ and N₂O.

13. Two presenters described methods and tools that are available and can be implemented to monitor GHG emissions and changes in carbon stocks from deforestation, degradation and devegetation, as well as the impacts of related policies and measures. It was suggested that remote sensing data, where available, can help establish national and/or sub-national baselines. Such data used together with novel remote sensing technologies and analytical methods that are currently being developed could improve cost-effectiveness and reduce uncertainties.

14. Markets, partnerships and policy frameworks can play an important role in the mitigation portfolio in agriculture, forestry and rural development. The applicability and effectiveness of mitigation options largely depend on national circumstances. For many Parties not included in Annex I to the Convention, there is a significant need for technical innovation and technology transfer. International cooperation and support was highlighted as a key parameter in this regard as it could assist in overcoming barriers such as the lack of financial resources for the development and transfer of environmentally sound technologies and in increasing public awareness on the use of advanced technologies.

B. Urban planning and development, including transportation

15. According to information from the United Nations Human Settlements Programme (UN HABITAT), 50 per cent of humanity live in cities. This figure demonstrates the important role that urban planning and development has in achieving more sustainable development in all countries. Urban areas and urban transport offer significant potential to reduce GHG emissions and can contribute to the global mitigation efforts through, for example, energy-efficient and environmentally sound technologies for the buildings sector, higher insulation standards for new and existing buildings, the promotion of public urban transport, walking and cycling, and an integrated approach to urban transport planning.

16. Several presenters emphasized that urban areas face many pressures other than climate change, including poor air quality, traffic congestion, “heat island” effects and noise. Efforts aimed at more sustainable urban transport and urban planning offer considerable potential for synergies in most of these fields. Current initiatives, including the sustainable city concept, aim to bridge vision and action in transforming cities by reducing energy demand, shifting to renewable energy supply, and facilitating cooperation and the sharing of knowledge. Other examples of current efforts presented during the workshop include:

- (a) The 2004 London Plan for urban planning and decentralized energy, which contains ambitious targets and timetables for the reduction of CO₂ emissions, as well as policy requirements to include energy-efficient design and technology and to use renewable energy technology wherever feasible;
- (b) National policies and measures which have been implemented in China, focusing on energy efficiency programmes for buildings, and the 2003 National Fuel Efficiency Standard.

17. Emissions from the transport sector are growing faster than those from all other sectors. Experience gained in tackling CO₂ emissions from cars shows that voluntary agreements with car manufacturers have had some effect in the European Union (EU) countries, but need to be further strengthened and amended by other instruments if the defined goals are to be met on time. A revised EU strategy builds on a legislative framework that takes an integrated approach. The involvement of other stakeholders, including fuel suppliers, EU member States and consumers, will be increased and the strategy will be reviewed in 2010.

18. Other mitigation options for reducing emissions from urban traffic that were presented during the workshop include: the shift from road to the other modes of transport, such as the use of inland waterways for the transport of waste, leading to considerable reductions in noise, energy consumption and CO₂ emissions; integrated approaches that result in reduced car-dependency and improved public transport systems; introducing improvements in fuel economy and fuel quality; and strategies for the diversification of fuels (e.g. introducing biofuels). Another area of interest is reducing or limiting emissions from aviation. One presenter introduced a recent initiative to include emissions from domestic and international aviation in an emissions trading scheme.

19. From the discussions and the presentations, it became clear that urban areas in developing countries will become increasingly important in addressing climate change, but will need further technical, logistical and financial support if they are to undertake relevant actions. The participation of various stakeholders in urban planning is seen as key to success: governments at the national level can create the overall framework or environment for action, whereas local authorities can focus on the more concrete planning of mass transport and develop a strategy towards sustainable cities. The private sector can provide new technologies and products or services to urban areas.

C. Energy efficiency, including industry, and residential and commercial end-use

20. According to data from the International Energy Agency (IEA), current trends in energy use are not sustainable. The scenarios of the IEA highlight the size of the mitigation challenge that governments are facing. Baseline scenarios project dramatic increases in global primary energy demand by 2030 and subsequent large growth in CO₂ emissions. It is estimated that approximately USD 20 trillion will be needed for investments in energy infrastructure by 2030; out of this total USD 11 trillion will be invested into the power generation sector. According to the IEA, urgent action is required given that these investments will be ‘locked in’ in infrastructure that may last for up to 60 years. An alternative policy

scenario predicts that 66 per cent of the reduction in GHG emissions that is required can be achieved by improving energy efficiency in end-use sectors and increased use of renewable and nuclear energy.

21. As several presenters mentioned, energy efficiency measures are of strategic importance in energy policy and planning given their potential to reduce CO₂ emissions, to contribute to energy security and to control energy costs. They highlighted efforts at the national level, including investments in low-carbon and renewable energy; improvements in energy efficiency through domestic programmes that promote energy efficiency as an issue of key importance in national energy policies; and the establishment of energy conservation plans aiming to achieve a reduction of energy consumption per unit of gross domestic product.

22. Other mitigation options mentioned include: a certificate scheme involving both energy suppliers, who are required to meet specific energy savings targets, and energy users (local communities, the owners of buildings, companies); the development of efficient lighting devices (such as light-emitting diode bulbs) for use in the residential and commercial sectors; the development of long-term energy policy; and fiscal instruments to foster the use of energy-efficient technologies. One presenter focused on an energy efficiency action plan that includes dynamic energy performance requirements for energy-consuming products, buildings and energy services combined with a wide range of policies and legislation in the areas of power production, combined heat and power production, the implementation of renewable energies, eco-design and the labelling of household appliances.

23. It was often mentioned that the options for mitigation depend to a great extent on national circumstances and regional differences. In many countries, existing technologies can be used to reduce energy demand, especially in the residential and commercial sectors. However, although their full potential has not been realized, existing technologies are not enough to address the climate change challenge. New and cost-effective technologies for mitigating GHG emissions in the residential and commercial sectors need to be developed further.

24. Bilateral and multilateral activities that promote technology transfer were also highlighted. One presentation focused on voluntary action plans by developing countries (setting as a target to maintain CO₂ emissions below the 1990 levels) covering several industrial sectors, including the steel and chemical industries. Capacity-building programmes to assist with the implementation of these action plans have been carried out in several developing countries.

25. During the discussions, it was pointed out that enabling environments, financial and fiscal mechanisms supporting energy-efficient technologies and limiting the use of energy-intensive devices, institutional innovations and public awareness activities are some of the instruments available to promote technologies. Further international cooperation and the development of global carbon markets can promote the transfer of the best available technologies and technological research and development.

D. Power generation, including clean fossil fuels and renewable energy

26. Current efforts to address climate change also involve the promotion of technological solutions in the power generation sector. Several presenters spoke of the need for a switch towards low-carbon energy sources and technologies for power generation, transmission and distribution. In addition to the reduction in CO₂ emissions, such efforts could contribute to reducing demand for fossil fuels and towards diversification of fuels used, as well as towards minimizing the impacts on the competitiveness of local markets. It was recognized, however, that if GHG emissions are to be substantially reduced at a reasonable cost, there is a need to maximize the use of the energy efficiency potential of programmes, to develop low-carbon electricity systems, and to promote international cooperation on a global scale.

27. In discussing the technologies, the presenters divided them into those that are already commercial and those that will be available in the future. Commercial technologies include renewable

energy (e.g. wind power, solar energy, geothermal energy, biomass), clean coal technologies, nuclear power, and large and small hydropower. The implementation of advanced technologies such as gasification, power generation combined with carbon capture and storage (CCS) in a variety of geologies, and hydrogen gas turbines require further support, dissemination and demonstration in order to bring them to the market. It was emphasized that none of these solutions alone can provide the solution to the climate change challenge; instead there is a need to use a portfolio of technologies.

28. Current efforts include the promotion of renewable energy sources, in particular national and regional programmes that aim to increase their share in the energy mix (e.g. to 20 per cent by 2020 in the EU). Other efforts involve the early implementation of innovative technologies, such as second-generation biofuels (which will yield greater environmental benefits than first-generation technologies), CCS projects and enhanced oil recovery. Some of these projects are demonstration or pilot activities as a result of bilateral or multilateral cooperation.

29. Several presenters mentioned that non-market barriers impede the further development and diffusion of existing low- and high-cost technological options, and called for the development of strategies to address such barriers. Innovative technological solutions such as CCS and second-generation biofuels will require strong international collaboration if they are to be introduced commercially. It was mentioned that appropriate legal, financial and regulatory policy frameworks would help progress in this regard. Some presenters referred to the further development of global carbon markets and emissions trading as potential sources of financial incentives that could be provided to speed up technology development, diffusion and transfer. They also mentioned that there is a need for capacity-building and public awareness in order to maximize the impact of technological solutions in the power generation sector.

- - - - -