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REVIEW OF PROGRAMME PLANNING AND IMPLEMENTATION

(Item 5 (b) of the provisional agenda)

**Mitigation of Transboundary Air Pollution from Coal-fired Power Plants in
North-East Asia**

Note by the Secretariat

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Annex I. Summary of Project Progress for Mitigation of Trans-Boundary Air Pollution
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I. OVERVIEW OF PROGRESS

1. Since 1996 NEASPEC had undertaken the first and second phases of technical assistance projects related to mitigation of transboundary air pollution from coal-fired power plants funded by the Asian Development Bank (ADB) to support collaboration among North-East Asian member States on this important subregional issue. Thus, the activities in this field can be considered as one of the earliest and longest collaboration examples on transboundary environmental issues under the umbrella of NEASPEC.

2. In the course of the 15th SOM held in Tokyo, Japan in March 2010 member countries reaffirmed their support to implement the third phase of the ADB Regional Technical Assistance (RETA) Project on Mitigation of Transboundary Air Pollution from Coal-fired Power Plants, which has the following components and activities:

Component 1: Air Pollution Abatement Plans (Integrated Strategies for Mitigating Air Pollution and Greenhouse Gases): Activities include

- (i) Assess potential approaches and outcomes of the co-benefits approach;
- (ii) Review existing and potential approaches to address transboundary air pollution in the North-East Asia subregion;
- (iii) Develop national and subregional strategy plan for the application of the co-benefits approach;
- (iv) Develop integrated plans on mitigating air pollution and greenhouse gases emissions for the selected cities as a demonstration project;

Component 2: SO₂ Emission Regulation and Compliance: Activities include

- (i) Assess the regulatory and technical conditions of controlling SO₂ emissions from coal-fired power plants in China;
- (ii) Provide recommendations on policy, regulatory and technical management for SO₂ emission compliance management, particularly relating to (a) management of transboundary air pollution, (b) management and operation of equipment for controlling air pollution at power plants in China;

Component 3: Mongolian Power Plant Emission Standards: Activities focus on

- (i) Assess air pollution situation in Ulaanbaatar and identify (a) the major contributor of air pollution with quantitative assessment and (b) cause of emissions; and make recommendations for improvement of air pollution;

- (ii) Review national emission standards and identify gaps with international standards and draft a national coal-fired power plant emission standards in Mongolia;

Component 4: Knowledge Transfer and Dissemination: Activities include

- (i) Training workshops for power plant staff;
- (ii) Regional workshops and site visits to showcase regional advances in power plant efficiency improvements and pollution-abatement technologies;
- (iii) International seminars on the co-benefits approach; and
- (iv) Dissemination materials, including project website and brochures.

Component 5: Demonstration Project and Management Modules (Application of the Co-benefits Approach¹ to Selected Cities): Activities will include

- (i) Develop a guiding manual on the reliability management and post-project assessment technology for the flue gas desulfurization equipment in China;
- (ii) Diagnose the technical conditions of air pollution emissions from the one to three selected power plant(s);
- (iii) Test options and apply technologies to reduce air pollution in the identified power plants in China.

3. The responsibilities of ADB and the Secretariat were split as follows: ADB implements Component 1 - Air Pollution Abatement Plans (Integrated Strategies for Mitigating Air Pollution and Greenhouse Gases); Component 2 - SO₂ Emission Regulation and Compliance; Component 3 - Mongolian Power Plant Emission Standards; and Component 5 - Demonstration Project and Management Modules (Application of the Co-benefits Approach to Selected Cities) through international/national consultants. ESCAP in its turn takes the lead for Component 4 - Knowledge Transfer and Dissemination.

4. Following the 15th SOM decisions, the international and national consultants hired by ADB have proceeded with active implementation of the third phase of the project. Particularly project kick-off meetings were held in Beijing in March 2010 with the representatives of the China Electricity Council (CEC) and in Ulaanbaatar in April 2010 with the Ministry of Nature, Environment and Tourism (MNET) of Mongolia.

¹ Co-benefits approach in this project refers to integrated policy approaches and measures that simultaneously address both greenhouse gases and local air pollutions.

5. With respect to Component 1 of the project–Air pollution abatement plans, the consultants were engaged in work with the implementing agencies in China and Mongolia on reviewing existing plans and strategies to abate air pollution from coal-fired plans and assessing their status of implementation. Moreover, a draft national strategy plan for application of the co-benefit approach was developed for Mongolia within this component of the project.

6. In regard to Component 2 of the project – SO₂ Emission regulation and compliance, the consultants analyzed the current situation with emissions of SO₂ and emission control technologies in Mongolia and China and compared them with the standards used in various countries both within and outside the North-East Asian subregion. The team of consultants assessed the regulatory and technical conditions of controlling SO₂ emissions from coal-fired power plants in China and underscored the significant progress this country has achieved within the last decade on improving the situation in this area. Thus, for China the importance has shifted to effective management and operation of equipments for controlling air pollution at power plants to further improve the efficiency of the pollution mitigation measures.

7. The work on the Mongolian power plant emission standards (Component 3) initiated with reviewing current standards in Mongolia and identifying gaps in comparison to the emission standards used in the subregion and beyond. The SO₂ control technologies were assessed as well as the compliance level of the coal-fired power plants operating in the country. As a result, the team of consultants developed draft emission standards to be further discussed in a wider format with various national stakeholders.

8. With respect to Component 5 of the project- Demonstration project and management modules, after consultations with CEC the CSF Power plant in Jiansu Province of China (600 MW generation capacity) was selected as a demonstration project site. Since the plant is using the most typical Flue Gas Desulphurization (FGD) technology to control SO₂ emissions, the evaluation of the efficiency of this abatement equipment can provide useful recommendations for improving of management and operation of this technology on a wider scale. In this regard, a guidance manual on the reliability management and post project assessment technology for FGD equipment will be produced at the end of the project. The aspects of the FGD technology to be covered by the consultants include assessments of the technical design, key equipment, operation and maintenance, and commissioning of the FGD systems.

9. As for the Component 4 of the project – Knowledge transfer and dissemination, which is being implemented jointly by ADB and ESCAP, the Secretariat held a Conference on Transboundary Air-Pollution in North-East Asia held in Tokyo in December 2008 to review the outcomes of existing studies on transboundary air pollution and the technical approaches to mitigating air pollutions from coal-fired power plants. The team of ADB consultants organized a workshop in Ulaanbaatar in November 2010 which allowed

collecting comments from different stakeholders on the mid-term project report. In the same month, a training workshop was organized in China to discuss some specific technical aspects of FGD system operation.

10. In addition to these efforts, the Secretariat plans to hold a Workshop on Transboundary Air Pollution in North-East Asia in November 2011 in the Republic of Korea to discuss national and subregional actions in line with pollution abatement plans and recommendations produced by the project report and to widely disseminate the acquired knowledge and information in the subregion. Another important objective of the workshop is to discuss options and opportunities for employing co-benefit approach in the subregion to simultaneously tackle the issues of domestic air pollution and climate change. The recent studies and international efforts in this direction taken by UNECE Convention on Long-range Transboundary Air Pollution (CLRTAP) and UNEP² clearly indicate that the mitigation of black carbon and troposphere ozone emissions, as well as measures to control methane emissions (an important precursor of troposphere ozone) can have a two-fold benefit – ability to mitigate climate change in short-term and significantly contribute to improving of air quality, especially in urban areas. Moreover, on policy level, the Executive Body of the CLRTAP during its meeting in December 2010 decided to include black carbon into the process of revision of the Gothenburg Protocol to the Convention as a component of particulate matter.

11. The workshop will be held back-to-back with the annual meeting of the Joint Research Project on Long-range Transboundary Air Pollutants in Northeast Asia (LTP Project, jointly implemented by China, Japan and the Republic of Korea) which will facilitate exchange of views and experiences among the participants of both events and look for possible synergies among different mechanisms for addressing transboundary pollution in the subregion.

12. The secretariat also reminds SOM that in line with the decisions of the 15th SOM held in Tokyo in March 2010, the new proposal of the Government of Russia related to transboundary air pollution is considered as a separate activity from the project implemented jointly with ADB. Please refer to document NEASPEC/SOM(16)/6 (agenda item 7) regarding the proposal of the Russian Federation on the “Review of existing and required capacities for addressing adverse environmental impact of transboundary air pollution in North-East Asia”.

² See, for example, the report of UNECE CLRTAP Expert Group on Black Carbon available at <http://www.unece.org/env/documents/2010/eb/eb/ece.eb.air.2010.7.e.pdf>, and the joint UNEP-WMO report available at http://www.unep.org/dewa/Portals/67/pdf/Black_Carbon.pdf

II. ISSUES FOR CONSIDERATION

13. The Meeting may wish to express views and ideas regarding future possible activities of NEASPEC in the field of transboundary air pollution, taking into consideration the needs for boosting multilateral cooperation in this field in the subregion.

14. The Meeting may wish to affirm its support to the Secretariat for its plans to organize the Workshop on Transboundary Air-Pollution in North-East Asia in November 2011 and invite member States to nominate relevant national institutions to act as the focal point for this event which would explore further opportunities for enhanced cooperation on transboundary air pollution in the subregion.

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Annex I. Summary of Project Progress for Mitigation of Trans-Boundary Air Pollution from Coal-Fired Power Plants in Northeast Asia³

1. Objectives of Project

The objectives of the project are to provide adequate study to ensure: i) trans-boundary air pollution will be mitigated, ii) environmental cooperation among countries of Northeast Asia will be enhanced, iii) technical capacity and knowledge transfer regarding prevention and management of trans-boundary pollution will be improved, and iv) capacity for management of coal-fired power plant emissions in Mongolia through the development of emission standards will be enhanced.

The study focuses on the following areas: (i) preparing an integrated plan for mitigating air pollution and greenhouse gas (GHG) emissions, (ii) preparing plans and concrete activities for SO₂ emission regulation and compliance, (iii) preparing Mongolian power plant emission standards considering international standards, (iv) conducting trainings, workshop, and study tours to build capacity and disseminate knowledge, and (v) preparing plans and concrete activities for the application of the co-benefits approach.

2. Summary of Key Activities

The project was kicked off in Beijing on 19 March 2010 when the consultants held a project kick-off meeting with representatives of China Electricity Council (CEC). The detailed kick-off minutes is provided in the inception report. A separate project kick-off meeting was held in Ulaanbaatar (UB) with the Ministry of Nature, Environment and Tourism (MNET) on 13 April 2010.

The consultants completed the inception report in May 2010 and mid-term report in November 2010. These two reports along with all supporting appendixes were circulated among ADB and other interested parties. The draft final report of the project is under preparation and is scheduled to be completed in July 2011. The final report will be completed in September 2011 after receiving comments from stakeholders.

Meetings were held among the consultants, CEC, MNET, ADB and ESCAP to discuss the project implementation plan, findings presented in the inception report as well as in the mid-term report. Comments and suggestions were provided by stakeholders and considered by the consultants.

³ This Annex has been reproduced as submitted to the secretariat by the ADB team of consultants

3. Key Activities Completed and Accomplishments

The consultants have performed extensive research and studies on the existing situation of coal-fired power plants in both Mongolia and the PRC. The accomplishments are summarized below:

3.1 SO₂ Emission Regulation and Compliance

The consultants have assessed SO₂ emissions, regulations and compliance. Specifically the following tasks have been performed:

- Assessed technologies used in coal-fired power plants internationally;
- Studied and summarized the current situations of SO₂ emissions and SO₂ emission control status from coal-fired power plants in Mongolia and China;
- Assessed the regulatory and technical conditions of controlling SO₂ emissions from coal-fired power plants in China;
- Studied and assessed the emission standards in many countries including Mongolia, China, Republic of Korea, Japan and United States;
- Diagnosed selected power plants to study the air pollution emissions and mitigation measures; and
- Reviewed and identified technologies to reduce air pollution from coal-fired power plants.

The consultants will provide recommendations on policy, regulatory and technical management in the draft final report for SO₂ emission compliance management, particularly relating to (i) management of trans-boundary air pollution, and (ii) management and operation of equipments for controlling air pollutions at power plants.

3.2 Mongolian Power Plant Emission Standards

One of the specific tasks of this project is to develop draft SO₂ emission and control standards for coal-fired power plants in Mongolia. The following tasks have been performed:

- Reviewed the current emission standards for coal-fired power plants in detail;
- Identified gaps between Mongolian standards and international standards;
- Assessed the SO₂ control technologies used in Mongolia;
- Evaluated compliance status of coal-fired power plants;
- Drafted emission standards for coal-fired power plants;

- Discussed the standards with stakeholders in a workshop;
- Revised the proposed emission standards, which will be presented to stakeholders during a workshop scheduled in May 2011.

3.3 Air Pollution Abatement Plans

The consultants worked with the implementation agencies in China and Mongolia in developing air pollution abatement plants. Some specific tasks performed are summarized below:

- Reviewed current plans and strategies in reducing air pollutions from coal-fired power plants;
- Assessed the implementation status of these plans and strategies;
- Assessed the potential outcomes of applying the co-benefits approach to address air pollution;
- Developed draft national strategy plans for the application of the co-benefits approach in Mongolia; and
- Discussed the development and implementation of sub-regional strategy.

3.4 Knowledge Transfer and Dissemination

The consultants conducted assessment on needs for knowledge transfer and dissemination of related agencies in China and Mongolia, and developed specific knowledge transfer and dissemination programs. The implementation of these programs is still ongoing and the activities are summarized as follows:

- A workshop, organized by the MNET and the consultants, was held in Ulaanbaatar, Mongolia on 2 November 2010. Broad stakeholders from power sector, Ministry of Mineral Resources and Energy and MNET environmental and energy attended the workshop and provided valuable comments to the study results presented in the mid-term report.
- A training workshop, organized by the CEC and the consultants, were held in November 2010 in China. Over 40 people attended this workshop. This workshop covered the following topics: i) assessment on operation of facilities for environmental protection in coal-fired power plant, operation of limestone gypsum wet FGD system, and technical aspects of baghouse for power plant.
- Another workshop is planned to be held in Ulaanbaatar in May 2011.

- The final workshop and conference on trans-boundary air pollution are planned in June 2011 in China to wrap up the project. Experts and stakeholders from ESCAP member countries in Northeast Asia will be invited to the conference. This conference will also serve as the consultation meetings with relevant government officials, power plant operators, and other concerned stakeholders to share findings of the project
- In addition, a training workshop to power plant staff will also be held at the same time.

3.5 Demonstration Project and Management Modules

In accordance with the requirement of the project, survey assessments of the trans-boundary air pollution need to be conducted. In addition, a guidance manual on the reliability management and post project assessment technology for the flue gas desulfurization (FGD) equipment will be developed.

FGD technology is the primary means to control SO₂ emissions from coal-fired power plants. Based on discussions with CEC, it was decided to perform an evaluation on FGD systems in a typical coal-power plant. CSF Power Plant in Jiansu Province of China was selected as the pilot plant for the assessment. This coal-fired power plant has two 300 MW generation units using FGD technology to control SO₂ emissions. Through the assessment and evaluation, the existing and potential issues can be identified, the solution to address the identified issues will be provided. It is expected that the function and efficiency of the FGD system and management will be improved. After assessment pilot project is completed, it will be an example for other power plant operators to learn from.

The assessment of this demonstration project started in October 2010. Site visits and preliminary assessment have been completed. The assessment report is being prepared and a draft report will be completed in July 2011. Findings of this assessment will be presented in the final workshop in July 2011 and power staff will be trained on how to operate FGD effectively.

The scope of the assessment includes four tasks as follows: i) technical design assessment; ii) key equipment assessment; iii) operation and maintenance assessment; and iv) commissioning FGD system. Each of the tasks is explained in detail below:

- **Evaluation on Technical Design:** The technical reliability and suitability, functional stability, and performance of the technical design of the FGD system have been evaluated. Key issues in the technical design have been determined, and solutions to these issues identified to improve the performance of the FGD systems.

- **Evaluation on Key Equipment:** Key equipment of the FGD system has been identified, and the suitability of the equipments application and their performance in the FGD systems have been evaluated. Furthermore, the working conditions of the selected key equipments have been studied in detail, and the abrasion, corrosion, scaling, and other faults of the key equipments were reviewed and measured in order to develop mitigation measures.
- **Evaluation on Operation and Maintenance:** The operation modes and manuals abided by during operation have been reviewed. The operation duration, faults possibility, and cost of the system have been assessed. In addition, performance indicators, such as energy consumption, material consumption, quality and quality of by-product, such as gypsum, and its recycling have been evaluated also. Based on the evaluation on operation and maintenance, the optimizing solution to the FGD system is being prepared.
- **Evaluation on Commissioning:** Potential difficulties during the start up of a FGD system have been assessed, including the automatic control of the FGD system and regulating function.