MINUTES OF MEETING
BETWEEN
THE JAPANESE TERMINAL EVALUATION TEAM
AND
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF MONGOLIA
ON THE JAPANESE TECHNICAL COOPERATION PROJECT FOR
"CAPACITY DEVELOPMENT PROJECT FOR AIR POLLUTION CONTROL
IN ULAANBAATAR CITY"

The Japanese Terminal Evaluation Team (hereinafter referred to as "the Team"), organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") headed by Mr. Nobuhiro Ikuro, visited Ulaanbaatar City in Mongolia from November 26 to December 7, 2012, for the purpose of conducting the Terminal Evaluation concerning the Japanese Technical Cooperation Project for "Capacity Development Project for Air Pollution Control in Ulaanbaatar City" (hereinafter referred to as "the Project").

During its stay in Mongolia, the Team had a series of discussions with the Mongolian authorities concerned and exchanged views on the achievement of the Project to fulfill the Record of Discussions signed on December 7, 2009.

Based on these discussions, the review was jointly conducted and recommendations were made by the Mongolian and Japanese sides. The related issues discussed are summarized in the attached document. The result of the evaluation was reported at the 6th Joint Coordinating Committee (hereinafter referred to as "JCC") on December 7, 2012 and was agreed.

Ulaanbaatar City, December 7, 2012

Mr. Nobuhiro Ikuro
Team Leader (Japanese side)
Deputy Director General, Global
Environment Department, Japan
International Cooperation Agency, Japan

Mr. Davaakhuu Purevdavaa
Vice Mayor of Ulaanbaatar City in charge of
Industry and Ecology,
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Witness:

Mr. Togmid Dorjkhand
Director-General, Department of Project
Financing and Debt Management,
Ministry of Finance,
Mongolia

Mr. Danzannorov Boldbaatar
Director, Department of Economic
Cooperation, Loan and Aid Policy,
Ministry of Economic Development
Mongolia

ATTACHED DOCUMENT

1. Result of Terminal Evaluation

1.1 Explanation from the Team

The Team explained the results of the evaluation for the Project as ANNEX 'Joint Evaluation Report'. The Team emphasized the recommendation for the Project as follows;

(a) Tasks to be completed by the end of the Project, Mar 2013

-Enforcing institutional framework on air pollution control

-Communicating with the decision-makers on air pollution control measures

-Implementing the capacity assessment on air pollution control of the Mongolian side

-Utilizing Final Seminar in January 2013 to share the project results with key stakeholders and to promote public awareness

(b) Tasks to be undertaken hereafter

-Strengthening the AQDCC's institutional framework for air quality management

-Promoting AQDCC's specialization

-Continuing human resource and institutional development in terms of quality and quantity

-Clarifying responsibilities among AQDCC, Municipality of Ulaanbaatar, District and Khoroo.

-Enhancing the contribution of AQDCC to National Committee on Air Pollution Reduction

1.2 Comments from the Mongolian side

Mr. Tsogtsaikhan, the leader of the Mongolian evaluation team, emphasized the importance of institutional framework on air pollution control. In order to tackle the air pollution problem, cooperation between the city level and the district level is necessary. He also commented that public awareness should be done not only from the city but also the district. And it is a key for effective public awareness promotion to understand clearly source of air pollution, effectiveness of countermeasure, and air pollution reduction contribution by the people, .

Mr. Batsaikhan, deputy director of Air Quality Agency of the Capital City (AQDCC), agreed on the result of the evaluation and especially emphasized importance of strengthening of the AQDCC's institutional framework for air quality management.

2. Discussion on Mongolian Request for Phase 2 of the Project

2-1 Mongolian request for the phase 2 JICA project

The Mongolian side expressed strong enthusiasm for the phase 2 JICA project now being evaluated by the Government of Japan. For indicative purpose the Team explained a possible process for the year 2013, including expected timing of the Ministry of Foreign Affairs' approval, a series of JICA's preparatory works to discuss and to agree the project contents with the Mongolian side and its inception toward the end of 2013. The Team expressed that JICA will make a great effort to push forward the JICA process in order to start the phase 2 project before the next winter given various uncertainties such as on going general election in Japan.

2-2 Importance of coordination between the Ulaanbaatar Clean Air Project (UBCAP) and the phase 2 JICA project

The Mongolian side indicates willingness to coordinate Ulaanbaatar Clean Air Project (UBCAP) supported by the World Bank and the anticipated phase 2 JICA project, the both of which shares the Ulaanbaatar Vice Mayor and AQDCC as the project director and the core counterpart agency respectively. The Mongolian side and the Team agreed that it is very important for the Mongolian side to coordinate those two projects to compliment each other and to generate synergy effects to support the Mongolian side for air pollution control in the Ulaanbaatar City in the most effective manner.

As an initial discussion to establish coordination mechanism between those two projects, the Mongolian side and the Team agreed the following points:

(a) Steering Committee of UBCAP and JCC of the phase 2 JICA project, for the both of which the Ulaanbaatar City Vice Mayor leads as the chairman, shall exchange information each other. In doing so, exchange of observers each other and joint meeting if needed will be sought. Qualification of the observers will be determined later. Also project level meetings between the two projects shall be organized periodically.

(b) Project activity level coordination shall be established along with the preparation and implementation of the both projects. The detailed coordination at the project activity level will be examined and discussed later by the relevant parties involved in those two projects.

ANNEX: Joint Evaluation Report (Terminal Evaluation)

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JOINT EVALUATION REPORT

(TERMINAL EVALUATION)

CAPACITY DEVELOPMENT PROJECT

FOR AIR POLLUTION CONTROL

IN ULAANBAATAR CITY

Ulaanbaatar City, December 7, 2012

Mr. Nobuhiro Ikuro	Mr. Chultemsuren Tsogtsaikhan
Team Leader (Japanese side)	Team Leader (Mongolian side)
Deputy Director General, Global	Senior Officer, Urban Development Policy
Environment Department, Japan	Department of the Mayor's Office of Capital City
International Cooperation Agency ,Japan	(UDPDMOCC), Mongolia

(Attached)

EVALUATION REPORT

TABLE OF CONTENTS

Abbreviation/ Acronyms

AQDCC	Air Quality Department of the Capital City
CFWH	Coal Fired Water Heater
C/P	Counterpart personnel
C/P-WG	Counterpart Working Group
DAC	Development Assistance Committee
EFDUC	Engineering Facilities Department of the Ulaanbaatar City
GM	General Manager
HOB	Heat Only Boiler
HSRA (HSUD)	Heating Stoves Regulatory Authority (Heating Stoves Utilization Department)
JCC	Joint Coordinating Committee
MCA	Millennium Challenge Account
MCEEIF	Millennium Challenge Energy Efficiency Innovation Facility
MNEGD (MNET)	Ministry of Nature, Environment and Green Development (Ministry of Nature, Environment and Tourism)
ME (MMRE)	Ministry of Energy (Ministry of Mineral Resources and Energy)
NAMEM	National Agency for Meteorology and Environment Monitoring
NAQO	National Air Quality Office
NCC	The National Committee on Coordination Management and Policy on Air Pollution
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
OJT	On the Job Training
PDM	Project Design Matrix
PM_{10}	(Particulate matter with a diameter of 10 micrometers or less)
$PM_{2.5}$	(Particulate matter with a diameter of 2.5 micrometers or less)
PO	Plan of Operation
R/D	Record of Discussions
UBCAP	Ulaanbaatar Clean Air Project
UDPDMOCC	Urban Development Policy Department of the Mayor's Office of Capital City

1. Introduction

1.1. Objective of the evaluation study

Two year and seven month has passed since the Project started. The project team has been undertaking a range of activities in order to achieve the project purpose. It is important for the Project to review its progress and examine to what extent the activities have led to producing expected outputs and the project purpose. The examination makes it possible to predict how much the Project achieves the project purpose at the end of the project period. The purpose of the terminal evaluation is to objectively evaluate the progress of the activities and achievements it has made thus far. Based on the results of the evaluation, the study is to give suggestions and recommendations to the Project with the aim of improving the Project's sustainability in attaining its overall goal.

1.2. Members of the evaluation team

The study team is composed of the following personnel.

Japanese side:

Mr. Nobuhiro Ikuro	Team leader	Deputy Director General, Global Environment Department, JICA
Mr. Taizo Yamada	Air Pollution Control	Senior Advisor in Environmental Management, JICA
Mr. Koji Maeshima	Evaluation planning/ Environmental monitoring	Program Officer, Environmental Management Division 1, Global Environment Department, JICA
Ms. Noriyo Aoki	Evaluation analysis	Consultant, IC Net Limited

Mongolian side:

Mr. Chultemsuren Tsogtsaikhan	Team Leader	Officer, Urban Development Policy Department of the Mayor's Office of Capital City (UDPDMOCC)
Ms. Sarangerel Enkmaa	Evaluation member	Officer, Environment Monitoring Strategy and Planning Division, National Agency for Meteorology and Environment Monitoring (NAMEM)

1.3. Schedule of the study

The study was conducted from November 25 to December 8, 2012.

Date		Schedule
11/25	(Sun)	Arrival in Ulaanbaatar (Ms. Aoki)
11/26	(Mon)	09:00 Meeting at JICA Mongolia Office 10:00-1300 Interviewing Japanese experts 14:00-1530 Interviewing NAMEM
11/27	(Tue)	09:00-12:20 Interviewing AQDCC 13:30-13:00 Interviewing Mongolian University of Science and Technology 15:30-16:20 Interviewing No.4 Power Plant 16:40-17:00:Visiting Project Office and Storage Room

11/28	(Wed)	09:00-10:00:Interviewing UDPDMOCC 10:30-11:30:Interviewing ME 13:30-14:20:Interviewing No.3 Power Plant 16:10-16:40:Intervieng NAQO 17:30-16:30:Interviewing AQDCC
11/29	(Thu)	09:00-10:00:Interviewing EFDUC
11/30	(Fri)	Reporting
12/1	(Sat)	Reporting
12/2	(Sun)	Arrival in Ulaanbaatar (Mr. Ikuro, Mr. Yamada, Mr. Maeshima) Japanese Evaluation Team Meeting
12/3	(Mon)	08:00 Meeting with AQDCC 10:00 Meeting with JICA Mongolia Office 11:30 Meeting with Ministry of Economic Development 14:20 Meeting with Ministry of Finance
12/4	(Tue)	Site visits to No. 4 Power Plant, Heat Only Boilers (HOBs)
12/5	(Wed)	09:00 Meeting with Project team 14:30 Meeting with Mongolian evaluation team member 17:30 Meeting with AQDCC
12/6	(Thu)	09:00 Meeting with World Bank 11:30 Meeting with Ministry of Economic Development 14:30 Meeting with National Committee for Air Pollution Reduction
12/7	(Fri)	10:00 Joint Coordinating Committee (JCC), Signing of the Minutes of the Meeting 14:30 Report to Embassy of Japan 16:00 Report to JICA Mongolia Office
12/8	(Sat)	Leave Ulaanbaatar (Japanese Team)

2. Outline of the Project

2.1. Background of the Project

As Mongolia is endowed with rich coal resources, the country is heavily reliant on coal for an energy source. Most of the coal consumed in Ulaanbaatar City is characterized by its high moisture and ash content, which is subject to heavy dust emission during combustion. Both people of Ulaanbaatar City and donors agree that the air pollution problem is worsening largely as a result of rapid urbanization. The sources of the pollution are three thermal power plants, approximately 200 HOBs (Heat Only Boilers), around a thousand smaller CFWHs (Coal Fired Water Heaters), 200,000 - 300,000 Ger stoves and wall stoves in more than 130,000 household in the Ger areas in Ulaanbaatar City. Air pollution is especially severe in winter when much coal is burned for heating. The most problematic pollutants at present are particulate matters like dust, PM_{10} and $PM_{2.5}$ emitted from these heating and power facilities.

The Ulaanbaatar City government established the Air Quality Division under the Nature Environmental Protection Department of the Capital City in 2006, which was later upgraded to the Air Quality Department of the Capital City (AQDCC) in February 2009. Because of the AQDCC's nascent status, its staff members did not have sufficient knowledge and experience to deal with this complicated problem.

The Government of Mongolia requested the Government of Japan to provide technical assistance to tackle air pollution problems in Ulaanbaatar City in 2007. The JICA conducted the Project Formulation Mission in April 2008, the first Detailed Planning Survey Mission in December 2008, and the overall framework for the assistance was designed.

A preliminary emission inventory survey including flue gas measurement was undertaken during the second Detailed Planning Survey Mission from March to May 2009. As a result of the survey, it was confirmed that large and medium emission sources including power plants and HOBs were contributing to degradation of air quality in Ulaanbaatar City. The survey also confirmed the efficacy of the enforcement of emission standards in improving air quality.

The contents of the technical assistance and the assignment of counterpart personnel (C/P) as well as the establishments of the counterpart working group (C/P-WG) were agreed during the third Detailed Planning Survey Mission in August 2009 and Record of Discussions (R/D) was signed and exchanged in December 2009. The Project entitled "The Capacity Development Project for Air Pollution Control in Ulaanbaatar City" was launched in March 2010.

2.2. Summary of the Project

(1) Overall Goal

Measures for emission reduction of air pollutants will be strengthened in Ulaanbaatar City.

(2) Project Purpose

Capacity for air pollution control in Ulaanbaatar City is strengthened, paying special attention to the human resource development of the Municipality of Ulaanbaatar and other relevant agencies among other aspects of the capacity development.

(3) Outputs

1) Capability of AQDCC and the other relevant agencies to evaluate emission inventory and impacts on air quality is developed.
2) Stack gas measurements are periodically implemented in Ulaanbaatar City.
3) Emission regulatory capacity of AQDCC is strengthened under the cooperation with the relevant agencies.
4) Emission reduction measures to major emission sources are enhanced by AQDCC.
5) AQDCC and the relevant agencies can integrate the results from output 1 to 4, and take them into the air quality management, and disseminate them to the public.

(4) Activities

1) Output 1

1.1) Existing emission inventories (activity data, emission factor etc.) are analyzed and framework of emission inventory (target pollutants, target emission sources, information items of emission sources etc.) is determined.

1.2) Stationary emission source investigation is planned and implemented.

1.3) Mobile emission source investigation is planned and implemented.

1.4) Investigation methods for fugitive dust, medical waste and open burning etc. are examined and the investigation is implemented.

1.5) Emission inventory for the baseline year is elaborated based on the investigation results for stationary, mobile and the other emission sources.

1.6) Air quality monitoring data are collected and analyzed to evaluate the adequateness of data.

1.7) Simulation is implemented for the baseline year, and accuracy of emission inventory and reproducibility of simulation model is confirmed.

1.8) Emission inventories for the target year and air

1.9) Emission inventory system including database and manual development is designed and established.

2) Output 2

2.1) Trainees learn theory and basics for stack gas measurement by training course in Japan.

2.2) Feasibility of sampling hole installation is assessed and target boilers for measurement are selected.

2.3) Measurement equipment with standard gas is introduced and training for measurement is implemented.

2.4) Simplified measurement methods such as Ringelmann chart and measurement methods for Ger stove etc. are investigated.

2.5) Target boilers are measured and stack gas status is evaluated.

2.6) Guidelines for stack gas measurement (sampling holes, simplified measurements, power plant boilers measurements, Ger stove measurements, instruments operation and boiler test etc.) are elaborated.

2.7) Guidelines for stack gas measurement are improved.

2.8) Adequateness of emission standard values and measurement methods of Mongolian National Standard (MNS) is evaluated and improvement is proposed if necessary.

2.9) Pilot inspection methodology is elaborated.

2.10) Pilot inspections are implemented, and the results are informed, and improvements are requested.

3) Output 3

3.1) Existing information on boilers is collected and compiled, and boiler registration and permission system is designed with reference to Japanese boiler registration system.

3.2) Target boilers for registration system are selected and site visit investigation is planned and implemented.

3.3) Boiler registration system is designed and developed.

3.4) Requirements for the permissions to operate (or good boiler certification) are defined.

3.5) All target boilers are registered and the permissions to operate (or good boiler certifications) are issued to the boilers which satisfy conditions.

4) Output 4

4.1) Seminar on MNS and boiler registration system is held.

4.2) Lecture on basic information of combustion control and air pollution control is held.

4.3) Major emission sources are diagnosed and air pollution control measures are proposed in the aspects of facilities and management.

4.4) Proposal of control measures for major air pollutants emission sources is introduced at seminar.

4.5) Visits on bad and good practices are implemented.

4.6) Step by step tighter controls and institutional arrangements are proposed so that the majority of boilers comply with MNS such as emissions standards.

5) Output 5

5.1) Knowledge and experiences in Japan are introduced at seminar.

5.2) Members of C/P and C/P-WG learn on air pollution control at training courses in Japan.

5.3) Japanese experts periodically have discussions with members of C/P and C/P-WG and make appropriate advices.

5.4) Members of C/P and C/P-WG contribute to city-wide air quality management program supported by the donor community.

5.5) C/P holds at least 2 times of seminars for public awareness on air pollution control under the cooperation of C/P-WG.

3. Method of evaluation

3.1. Five evaluation criteria

The JICA adopted "the Five Evaluation Criteria" for project evaluation. The five criteria are namely:

1) Relevance: A criterion for considering the validity and necessity of a project regarding whether the expected effects of a project (or project purpose and overall goal) meet with the needs of target beneficiaries; whether a project intervention is appropriate as a solution for problems concerned; whether the contents of a project is consistent with policies; whether project strategies and approaches are relevant, and whether a project is justified to be implemented with public funds of Official Development Assistance (ODA).
2) Effectiveness: A criterion for considering whether the implementation of project has benefited (or will benefit) the intended beneficiaries or the target society.
3) Efficiency: A criterion for considering how economic resource/inputs are converted to results. The main focus is on the relationship between project cost and effects.
4) Impact: A criterion for considering the effects of the project with an eye on the longer term effects including direct or indirect, positive or negative, intended or unintended, and
5) Sustainability: A criterion for considering whether produced effects continue after the termination of the assistance.

3.2. Data collection methods and analysis

The study collected quantitative and qualitative data relevant to the Project from a range of information sources by using various methods. This approach enables the Team to undertake triangulation of methods and information sources, thereby evaluating an achievement of outputs and project purpose. The focus of the study is put on the collection and analysis of qualitative data, as well as quantitative one, since the main purpose of the study is to make an in-depth analysis of hindering and contributing factors to the implementation of the Project and to understand reasons for having such factors. Thus, research methods adopted for the study centered on quantitative and qualitative data collection methods including interviews with semi-structured questions, questionnaires, verifiable data and observations.

Review of literature had been undertaken in Japan before the Team visited Mongolia. The main purpose of the literature review was to confirm the level of the project performance and examine the implementation process. At the same time, the questionnaires were prepared for six Japanese experts and three C/P and C/P-WG. Before the consultant for evaluation analysis arrived in Mongolia, these questionnaires had been collected. Based on information from the answered questionnaires, the items of interviews had been prepared for further investigation.

After the Team reached Mongolia, in-depth interviews were conducted with key informants such as

the government officials of Mongolia, power plant staff, Japanese experts, C/P and C/P-W/G.
The information generated by these study methods was then analyzed based on the five evaluation criteria.

3 Project Inputs

3.3. Inputs from Japan

3.3.1. Dispatch of Japanese experts

A total of 14 short-term experts in nine different fields including air pollution control, stack gas measurement, stationary/ mobile source inventory, simulation, etc. have been working since the inception of the Project. The total Person/Month spent is 73.6 up to now. By the end of the Project, it will be 102.30.They have been dispatched to Mongolia intermittently so that the seasonal needs of the Project, i.e. much heavier workload in the winter time, can be efficiently accommodated. For more detailed information on the dispatch of Japanese experts, see "Annex 2: List of Japanese Experts".

Table MM Inputs for Each Speciality[1)]

Specialty	Expert Number	Related Output	M/M	
			Mongol	Japan
Leader/Air Pollution Control	1	1-5	14.00	1.90
Stack Gas Measurement	4	2	33.23	2.20
Boiler Technology for Air Pollution	2	4	8.00	-
Stationary Source Inventory /Simulation	1	1	13.17	-
Database	1	3	8.00	-
Energy Conservation Technology (Heat)	1	4	4.00	-
Energy Conservation Technology (Electricity)	1	4	2.50	-
Simulation	1	1	4.50	-
Stationary Source Inventory	1	1	10.33	-
Project coordinator	1	-	-	0.47
Total	14	-	97.73	4.57

Note 1) Total inputs of all the project period

3.3.2. Training of C/P in Japan

A total of 19 C/P participated in the training held in Japan. After the terminal evaluation, the six trainees will be dispatched. A total of 25 trainers will participated in the training in Japan. The training areas included Stack Gas Monitoring, Environmental Administration, and Environmental Management. For the details on the training in Japan, see "Annex 3: List of C/P Training in Japan".

3.3.3. Local expenditure by Japan

By October 2012, a total of 38.54 million yen has been provided by the Japanese side for daily project operation. For the details see "Annex 5: Project Cost borne by Japanese Side".

3.3.4. Machinery and equipment provided by Japan

Equipment and machinery including a stack gas analyzer, automatic dust sampler, portable stack gas analyzer, which is worth 30.42 million yen in total, has been provided. For more detail see "Annex 4: List of Machinery and Equipment".

3.4. Inputs from Mongolia

3.4.1. Assignment of C/P

The Vice-mayor is appointed as the Project Director and the Director of the AQDCC is appointed as the Project Manager. Concurrently the deputy director has been acting Director of the AQDCC. Except the Project Manager of the AQDCC, 41 people in total from the AQDCC and other related organizations and agencies such as National Agency for Meteorology and Environment Monitoring (NAMEM), Central Laboratory of Environment and Metrology (CLEM), thermal power plants and others have been working as the C/P and C/P-WG, and received technical transfer from the Japanese experts. For more detail see "Annex6: List of Counterpart Personnel".

3.4.2. Local cost borne by Mongolia

By the time of the terminal evaluation, the AQDCC has spent about 19.18 million tugrik renting the project offices.

3.4.3. Facilities provided by Mongolia

The AQDCC provided facilities necessary for project implementation. Such facilities include two office spaces with heating and electricity, a copying machine, the internet facilities, and a laboratory space.

4. Evaluation results

5.1 Relevance: 5.high[1]

The Project is well consistent with the Mongolian policies on the air pollution control measures as well as with Japan's ODA policy towards Mongolia. It is also appropriately responding to the needs of the capacity development for the air pollution control measures. The approach is to utilize Japan's comparative advantages in the area of air pollution mitigation measures and experiences. The range of activities is appropriately designed to avoid overlapping with projects by other donor agencies.

5.2 Effectiveness: 4.moderately high

Owing to the transfer of technology by the Project, the capability of stack gas measurement and data analysis of C/P and C/P-WG have been developed. Almost all the outputs have been achieved.

The Project came up with the eleven measures. Out of them, three measures were approved by the City Council through the efforts of the AQDCC and C/P-WG. Three measures become part of the City's Operational Program. Hereafter, the remaining measures will be evaluated by the AQDCC and the related organizations for possible implementation. More efforts for institutional framework building are required for enhancing the air quality management capacity as a whole.

5.3 Efficiency: 4.moderately high

At the time of the Mid-term Review, it was pointed out that the Project faced the delay of the key equipment and it influenced the progress of the Project. Thereafter, the C/P and JICA experts exerted efforts to minimize its negative consequences by holding trainings, laboratory OJT, seminars and workshop continuously. In spite of change of administration, the planned activities have almost been implemented. The three trainings in Japan already implemented, and one training to be held in December have been carefully designed to support C/P and C/P-WG to drive forward the Project's activities. The local resources have been utilized as necessary. The AQDCC's staff turnover has been low and the number of staff increased. The inputs produced the expected outcomes adequately. It took longer time to establish to coordination among agencies in C/P-WG than expected. Taking account of these things comprehensively, the efficiency is judged as moderately high.

5.4 Impact: 4.moderately high

The prospect for achieving of the overall goal "Measures for emission reduction of air pollutants will

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[1] The rating is set for 5.high, 4.moderately high, 3.fair, 2. slightly low, 1.low by using on a scale of 1 to 5. The achievement which has been achieved at the time of the terminal evaluation or will be achieved at the end of the Project is judged; is rated. "5. high" indicates fully achieved, "4.moderately high" almost achieved,"3. fair" medium degree, "2. slightly low" achieved below the medium degree and "1.low" not achieved. The achievement is measured not only by the numerical achievement, but the contents of achievement.

be strengthened in Ulaanbaatar City." is fair. In order to achieve the overall goal, it is required for C/P and stakeholders concerned to upgrade the quantity and quality of activities to a satisfactory level, and to develop their capacity to present a persuasive recommendations and suggestions based on credible data and information, contributing to elaboration of necessary legislations and to implementation of air pollution control measures. The overall goal will be achieved as long as the AQDCC and related organizations continuously strengthen their ability.

5.5 Sustainability: 3.fair

Sustainability examines whether the Project's effects continue after the termination of the Project or not. The sustainability in terms of policy is moderately high, because the Mongolian policy directions are favorable to air pollution control. However, from the institutional point of view, collaboration between agencies in C/P and C/P-WG should be strengthened. As for technical capability, the sustainability of the stack gas measurement appears to be high. But, some areas such as simulation modeling, boiler inspection, and energy saving measurement remain to be further supported to acquire enough sustainability. Therefore, it is concluded that the sustainability as a whole is considered fair.

6. Recommendations

Ⅰ. Tasks to be completed by the end of the Project

(1) Enforcing institutional framework on air pollution control

The AQDCC shall make an official agreement in relation to the collaboration with organizations at a national level as well as a municipal level in order to establish an institutional framework for air quality management. An agreement which clarify roles, responsibilities and division of work, should be documented. The training in Japan of "Air Pollution Administration Course" which will be held in December 2012, will be utilized to promote this process.

(2) Communicating with the decision-makers on air quality management

By the time of the terminal evaluation, several measures to combat air pollution have been come up with. In order to realize the measures, the measures shall be discussed and examined among the stakeholders, and then go through relevant upper level organizations for their endorsement. The proposals will be then submitted to the decision-makers by the termination of the Project.

(3) Implementing the capacity assessment on air quality management of the Mongolian side

SCDM (Sustainable Capacity Development Mechanism : SCDM) will be updated and the capacity on air quality management of C/P and C/P-WG will be assessed. By comparing the initial status with the updated status, the progress of capacity development brought by the Project will be analyzed. This will reveal issues to be tackled for future JICA assistance.

(4) Utilizing Final Seminar in January 2013 to share the project results with key stakeholders and to promote public awareness

The Final Seminar is planned to be held in January 2013. The Seminar will invite around 100 participants, such as members of C/P and C/P-WG, the National Committee on Air Pollution Reduction, and the Donor and Mongolian Joint Meeting, among others. On this occasion the outcomes of the cooperation are shared with the audience. Taking advantage of the Final Seminar, the presence of the Project will be enhanced among key stakeholders and the public.

Ⅱ. Tasks to be undertaken from now on

(1) Strengthening the AQDCC's institutional framework for air quality management

1) -Promoting AQDCC's specialization

The AQDCC should become specialized organization with a substantial expertise concerning air quality management in order to provide scientific data and information to support the decision-making process. Among others QA/QC (Quality Assurance and Quality Control) for necessary works in air quality management, and personnel system should be further developed.

2) **Continuing human resource and institutional development in terms of quality and quantity**

The number of the staff is so small for its enormous tasks. The level of expertise of staff should be further improved. Though the Project has been contributing that, those issues should be addressed so that the AQDCC become an effective organization for air quality management.

3) Clarifying responsibilities among AQDCC, Municipality of Ulaanbaatar, District and Khoroo.

Since the AQDCC is a relatively new agency, there is a no clear definition of the relationship between the AQDCC and other part of the Ulaanbaatar City such as District and Khoroo in air quality management related activities. At present, the AQDCC spends a considerable amount of work for which District could be more efficient. For instance they distribute ger stoves or other materials for ger area households. The Ulaanbaatar City should clearly demarcate duties and scope of work related to the air quality management. The better co-working system for the AQDCC, District and Khoroo should be sought out.

(2) Enhancing the contribution of AQDCC to National Committee on Air Pollution Reduction

The National Committee for Air Pollution Reduction is an organization endowed with authority to give directions to organizations concerning air pollution reduction. The National Committee for Air Pollution Reduction is able to officially demarcate roles and responsibilities of each organization. Therefore, the AQDCC should increase contribution to National Committee on Air Pollution Committee and also exert efforts to gain more support from the National Committee on Air Pollution Committee.

8. Lessons Learned

(1) Project formulation through several preparation studies and detailed planning surveys brought an effective technology transfer.

The Project has been formulated by the project formulation studies, and the detailed planning surveys. Therefore the activities and C/P, C/P-WG agencies are properly identified. Both of Mongolian side C/P personnel and JICA experts are properly selected. In a case of technical transfer with special expertise, it is essential to understand the situation of the field, existing human resources and organizations in order to make plans and to implement them.

(2) Timing of inception of the project with the activities concentrating in winter

Since the most of the activities are focusing on winter, the appropriate timing of project inception has to be identified. The JICA should carefully prepare a project before sending the experts and equipment so that those inputs become timely and effective.

(3) Involvement of the decision-maker in the CD project

The capacity development project would deal with institutional development in addition to human development. It is important for a capacity development project to include the decision-maker as C/P and / or stakeholder. The understanding and collaboration of the decision-maker is indispensable.

ANNEX I PROJECT DESIGN MATRIX Ver.

Revised as of 30th November, 2011

Project Title	Capacity Development Project for Air Pollution Control in Ulaanbaatar City
Duration of the Project	3 years
Target Group	Air Quality Department of the Capital City (AQDCC) and the other Counterpart Working Group (C/P-WG)
Target Area	Ulaanbaatar City
Version 3	Revised from Version 2 on Nomember 30, 2011

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal of the Project Measures for emission reduction of air pollutants will be strengthened in Ulaanbaatar City	1. Most of major stationary emission sources like 150 to around 200 HOBs and 3 power plants in Ulaanbaatar City will be under control to comply with emission standards.	1. Compliance report on emission standards	・Adequate financial resources are available for the Power plants and HOBs for emission reduction related investments. ・the planned air pollution tax by Mongolian government assisted by the donor committee is designed and implemented appropriately to generate incentive for HOBs and Power plants to reduce emissions
Purpose of the Project Capacity for air pollution control in Ulaanbaatar City is strengthened, paying special attention to the human resource development of the MUB (the Municipality of Ulaanbaatar) and other relevant agencies among other aspects of the capacity development.	1. AQDCC publishes annual report on air pollution such as emission inventory summary, air quality evaluation results and emission measurement results etc. 2 times during the project period under the cooperation with the relevant agencies. 2. AQDCC makes at least 5 recommendations on air pollution control to vice-mayor of MUB based on the annual reports under the cooperation with the relevant agencies. 3. AQDCC makes reports on the results obtained by the project to ~~all~~ roundtable meetings and its equivalents held during the project period under the cooperation with the relevant agencies. 4. Policy, regulatory and institutional frameworks for air pollution control are improved through measures such as issuing of Mayor's instructions and signing official documents between the AQDCC and concerned national/ municipal government organizations.	1. Annual report on air pollution 2. Recommendations on air pollution control 3. Report materials to NCC to the roundtable meetings and its equivalents 4. Documents such as Mayor's instruction and official agreement documents indicating policy, regulatory and institutional framework improvement	・NCC and Roundtable or their equivalents continue.

Outputs from the Project			
1. Capability of AQDCC and the other relevant agencies to evaluate emission inventory and impacts on air quality is developed.	1.1 Emission Inventory database is continuously utilized, and data is regularly revised. 1.2 Simulation model is established, which enables AQDCC and relevant agencies assess priorities of possible air pollution control measures.	1.1 Emission inventory for the baseline year 1.2 Simulation results for the baseline year 1.3 Emission inventory and simulation results for the target year and air pollution control options. 1.4 Revised data of emission inventory database once a year for 2 years.	Mongolian National-level agencies and MUB keep their priorities on air pollution control.
2. Stack gas measurements are periodically implemented in Ulaanbaatar City.	2.1 Stack gas measurements are implemented at least 50 times during the project implmentation period. 2.2 Responsible agencies such as NIA, NAQO and AQDCC conduct inspections of emission sources based on technically verified methodologies.	2.1 Summary report for the training in Japan 2.2 Report of stack gas measurement results 2.3 Guidelines for sampling holes, simplified measurements, power plant boilers measurements, Ger stove measurements, instruments operation and boiler test etc. 2.4 Proposal for MNS improvement	
3. Emission regulatory capacity of AQDCC is strengthened under the cooperation with the relevant agencies.	3.1 Boiler registration system is regularly revised and be utilized as the baseline information regarding emission inventory data base and emission control activities.	3.1 Boiler registration system and registered boiler list 3.2 Boiler list with the permission to operate (or good boiler certification)	
4. Emission reduction measures to major emission sources are enhanced by AQDCC.	4.1 At least 20 cases of major stationary emission souces are diagnosed and countermeasures are proposed. 4.2 On-site improvements at boiler facilities such as instllation of stack flue gas sampling holes and better combustion ontrols are discussed with the boiler owners and operators. The reports and meeting minutes are elaborated.	4.1 Diagnostic report and measures proposal for major air pollutants emission sources 4.2 Seminar report and lecture report 4.3 Boiler visit results report	

5. AQDCC and the relevant agencies can integrate the results from output 1 to 4, and take them into the air quality management, and disseminate them to the public.	5.1 The C/P and C/P-WG share the project outputs with the NCC and the public along with the reports and meeting minutes elaborations.	5.1 Reports on seminars and training courses in Japan 5.2 Minutes of meetings 5.3 Seminar reports	
Activities of the Project	**Input of the Project Japanese Side**	**Inputs of the Project Mongolian Side**	**Important Assumptions**
1.1 Existing emission inventories (activity data, emission factor etc.) are analyzed and framework of emission inventory (target pollutants, target emission sources, information items of emission sources etc.) is determined. 1.2 Stationary emission source investigation is planned and implemented. 1.3 Mobile emission source investigation is planned and implemented. 1.4 Investigation methods for fugitive dust, medical waste and open burning etc. are examined and the investigation is implemented. 1.5 Emission inventory for the baseline year is elaborated based on the investigation results for stationary, mobile and the other emission sources. 1.6 Air quality monitoring data are collected and analyzed to evaluate the adequateness of data. 1.7 Simulation is implemented for the baseline year, and accuracy of emission inventory and reproducibility of simulation model is confirmed. 1.8 Emission inventories for the target year and air pollution control cases are elaborated and simulations are implemented with the inventories to evaluate impacts on air quality. 1.9 Emission inventory system including database and manual development is designed and established.	(1) Dispatch of Japanese experts (2) Provision of necessary equipment (3) Holding of local seminars (4) Training course implementation in Japan	(1) Establishment of C/P, C/P-WG and JCC (Joint Coordinating Committee) (2) Assignment of C/P and C/P-WG staff (3) Provision of necessary office space and laboratory (4) Preparation of necessary permissions for project implementation	Current national energy policies relying on the domestic coal production and consumption are maintained. There are no frequent leaves, transfers or resignations of C/P and C/P-WG.

2.1 Trainees learn theory and basics for stack gas measurement by training course in Japan. 2.2 Feasibility of sampling hole installation is assessed and target boilers for measurement are selected. 2.3 Measurement equipment with standard gas is introduced and training for measurement is implemented. 2.4 Simplified measurement methods such as Ringelmann chart and measurement methods for Ger stove etc. are investigated. 2.5 Target boilers are measured and stack gas status is evaluated. 2.6 Guidelines for stack gas measurement (sampling holes, simplified measurements, power plant boilers measurements, Ger stove measurements, instruments operation and boiler test etc.) are elaborated. 2.7 Guidelines for stack gas measurement are improved. 2.8 Adequateness of emission standard values and measurement methods of MNS is evaluated and improvement is proposed if necessary. 2.9 Pilot inspection methodology is elaborated. 2.10 Pilot inspections are implemented, and the results are informed, and improvements are requested.			
3.1 Existing information on boilers is collected and compiled, and boiler registration and permission system is designed with reference to Japanese boiler registration system. 3.2 Target boilers for registration system are selected and site visit investigation is planned and implemented. 3.3 Boiler registration system is designed and developed. 3.4 Requirements for the permissions to operate (or good boiler certification) are defined. 3.5 All target boilers are registered and the permissions to operate (or good boiler certifications) are issued to the boilers which satisfy conditions.			

4.1 Seminar on MNS and boiler registration system is held. 4.2 Lecture on basic information of combustion control and air pollution control is held. 4.3 Major emission sources are diagnosed and air pollution control measures are proposed in the aspects of facilities and management. 4.4 Proposal of control measures for major air pollutants emission sources is introduced at seminar. 4.5 Visits on bad and good practices are implemented. 4.6 Tighter controls and institutional arrangements are proposed so that the majority of boilers comply with MNSs such as emissions standards			**Pre conditions**
5.1 Knowledge and experiences in Japan are introduced at seminar. 5.2 Members of C/P and C/P-WG learn on environmental management at training courses in Japan. 5.3 Japanese experts periodically have discussions with members of C/P and C/P-WG and make appropriate advices. 5.4 Members of C/P and C/P-WG contribute to city-wide air quality management program supported by the donor community. 5.5 C/P holds at least 2 times of seminars for public awareness on air pollution control under the cooperation of C/P-WG.			

C/P: Counterpart
C/P-WG: Counterpart Working Group
JCC: Joint Coordinating Committee
NCC: The National Committee on Coordination Management and Policy on Air Pollution
HOB: Heat Only Boiler

Annex 2 List of Japanese Experts

(1) Short Term Expert

Name of Expert	Specialty	Period	Total M/M
Akeo FUKAYAMA	Leader / Air Pollution Control	2010/3/20 – 2010/4/18: 30days 2010/5/20 – 2010/6/30: 42days 2010/8/22 – 2010/9/23: 33days 2010/11/8 – 2011/1/7: 61days 2011/2/6 – 2011/3/6: 29days 2011/5/30 – 2011/6/25: 27days 2011/8/26 – 2011/9/24: 30days 2011/11/10 – 2011/12/9: 30days 2012/1/10 – 2012/1/22: 13days 2012/3/24 – 2012/3/31: 8days 2012/4/21 – 2012/5/3: 13days 2012/6/10 – 2012/6/23: 14days 2012/8/16 – 2012/8/30: 15days 2012/9/17 – 2012/10/3: 17days 2012/10/14 – 2012/10/23: 10days Working period in Japan are 2010/3/8 – 2010/3/19: in 10days 2010/7/5 – 2010/8/12: in 14days 2011/1/20 – 2011/1/25: in 4days 2011/3/7 – 2011/3/11: 5days 2011/5/16 – 2011/5/19: in 3days 2012/5/28 – 2012/6/7: in 9days 2012/10/9 – 2012/10/11: 3days 2012/10/29 – 2012/10/31: 3days	14.10
Toshiharu OCHI	Stack Gas Measurement 1	2010/3/20 – 2010/5/27: 69days 2010/8/22 – 2010/9/19: 29days 2010/11/15 – 2010/12/29: 45days 2011/2/17 – 2011/3/23: 35days 2011/5/21 – 2011/6/12: 35days 2011/10/8 – 10/30: 23days 2011/12/20 – 2012/2/28: 71days 2012/5/20 – 2012/6/3: 15days 2012/9/4 – 2012/10/4: 31days 2012/11/4 – 2012/12/3: 30days	12.77
Kenichi SAKURAI	Stack Gas Measurement 2	2010/8/22 – 2010/9/30: 40days 2010/11/22 – 2010/12/24: 33days 2011/1/13 – 2011/2/28: 47days 2011/11/13 – 2012/1/11: 60days Working period in Japan is 2012/3/12 – 2012/3/19: in 6days	6.20
Nobuhiro HONDA	Stack Gas Measurement 3	2010/3/20 – 2010/4/18: 30days 2010/5/22 – 2010/6/20: 30days 2010/11/8 – 2010/12/17: 40days 2011/1/17 – 2011/2/22: 37days 2011/12/17 – 2012/2/14: 60days	8.57

		2012/9/29 – 2012/10/28: 30days Working period in Japan is 2010/6/21 – 2010/8/2: in 30days	
Tadayoshi USUI	Stack Gas Measurement 4	2010/8/22 – 2010/9/24: 34days 2010/11/22 – 2010/12/17: 26days 2011/2/7 – 2011/3/8: 30days 2011/11/21 – 2012/1/29: 70days Working period in Japan is 2010/5/2 – 2010/7/13: in 30days	6.33
Yasufumi NAKAJIMA	Boiler Technology for Air Pollution Control 1	2010/6/17 – 2010/7/1: 15days 2010/9/25 – 2010/10/9: 15days 2010/12/3 – 2010/12/17: 15days 2011/2/18 – 2011/3/4: 15days 2012/1/7 – 2012/1/21: 15days 2012/3/27 – 2012/4/10: 15days 2012/10/3 – 2012/10/17: 15days	3.50
Masanori EBIHARA	Boiler Technology for Air Pollution Control 2	2010/4/4 – 2010/4/18: 15days 2010/6/17 – 2010/7/1: 15days 2010/9/25 – 2010/10/9: 15days 2010/12/3 – 2010/12/17: 15days 2011/2/18 – 2011/3/4: 15days 2011/5/28 – 2011/6/11: 15days 2012/1/7 – 2012/1/21: 15days 2012/10/7 – 2012/10/21: 15days	4.00
Toru TABATA	Stationary Source Inventory / Simulation1	2010/4/4 – 2010/4/18: 15days 2010/5/25 – 2010/7/8: 45days 2010/10/12 – 2010/12/12: 62days 2011/2/5 – 2011/3/9: 33days 2011/5/18 – 2011/6/16: 30days 2011/9/20 – 2011/11/30: 67days (temporary return to Japan 2011/10/26 – 2011/10/30: 5days) 2012/1/9 – 2012/1/29: 21days 2012/3/17 – 2012/4/11: 26days 2012/5/28 – 2012/6/17: 21days 2012/8/22 – 2012/9/17: 27days 2012/10/25 – 2012/11/8: 15days 2012/11/18 – 2012/12/9: 21days	12.77
Atsushi MURAI	Database	2010/5/25 – 2010/6/8: 15days 2010/11/8 – 2010/12/24: 47days 2011/1/17 – 2011/2/13: 28days 2011/5/24 – 2011/7/8: 46days 2011/8/8 – 2011/8/19: 12days 2011/9/11 – 2011/10/1: 20days 2012/1/17 – 2012/2/14: 29days 2012/8/10 – 2012/8/25: 16days 2012/9/29 – 2012/10/24: 26days 2012/11/11 – 2012/11/28: 18days	8.57
Sadao HIGAKI	Energy Conservation Technology (Heat)	2010/6/24 – 2010/7/8: 15days 2010/10/2 – 2010/10/16: 15days	3.50

		2011/1/3 – 2011/1/14: 12days 2011/3/4 – 2011/3/21: 18days 2011/6/1 – 2011/6/15: 15days 2011/9/20 – 2011/10/4: 15days 2012/10/7 – 2012/10/21: 15days	
Susumu TAKAHASHI	Energy Conservation Technology (Electricity)	2010/6/24 – 2010/7/8: 15days 2010/10/2 – 2010/10/13: 12days 2011/3/4 – 2011/3/21: 18days 2011/6/1 – 2011/6/15: 15days 2011/9/20 – 2011/10/4: 15days	2.50
Shinya NAKATA	Simulation 2	2010/5/25 – 2010/6/8: 15days 2011/2/7 – 2011/2/21: 15days 2011/9/5 – 2011/10/1: 27days 2011/11/8 – 2011/12/25: 48days 2012/9/5 – 2012/9/29: 22days 2012/10/31 – 2012/11/7: 8days	4.50
Hiroyuki MAEDA	Mobile Source Inventory	2010/5/25 – 2010/7/8: 45days 2010/8/30 – 2010/10/29: 61days 2010/11/22 – 2010/12/17: 26days 2011/2/19 – 2011/3/18: 28days 2011/5/23 – 2011/7/8: 47days 2011/11/8 – 2011/12/23: 46days 2012/3/1 – 2012/3/27: 27days 2012/11/12 – 2012/1/27: 15days	9.83
Ei EDO	Project Coordinator	2010/5/25 – 2010/6/8: 15days 2010/11/8 – 2010/11/22: 15days 2012/5/26 – 2012/6/24: 30days	2.00

Annex 3 List of Counterpart Training in Japan

(1) List of Trainees on Stack Gas Monitoring

Name	Affiliation	Title
Dorjjartsan DAVAADORJ	AQDCC	Officer in charge of monitoring network and measurement
Gan-Ochir DAVAAJARGAL	AQDCC	Officer
Jambaldorj BAYARMAGNAI	NAQO	Officer
Bayar ERDEMBILEG	CLEM	Engineer
Enkhtuvshin MYAGMARKHUU	PP2	Boiler Engineer
Buyannemekh GANZORIG	PP3	Engineer regimen of boiler
Tsevegee ALTANGEREL	PP4	Maintenance worker of Boiler System
Bayarsuren MUNKHTULGA	PP4	Maintenance worker of Boiler Section

(2) List of Trainees on Environmental Administration

Name	Affiliation	Title
Byambaa SARAN	MNET	Deputy Director, Environment and Natural Resources Department
Tserensodnom NYAMDORJ	IACC	Chief, Environment, Tourism, Geology and Mining Inspection Department
Damdin DAVAASUREN	MMRE	Senior Officer, Fuel Policy Department
Gombodorj BOLORMAA	MRTCUD	Senior Officer, Urban Development and Land Affairs Policy Department
Chultemsuren TSOGTSAIKAHN	UDPDMOCC	Senior Officer Responsible at Ecology and Energy Issues

(3) List of Trainees on Environmental Management (2011)

Name	Affiliation	Title
Baast GAN-OCHIR	HSUD	Chairman
Tsendeekhuu MUNKHBAT	MNET	Officer for environmental pollutions, Department of Environment and Natural Resource management
Chultemsuren BATSAIKHAN	AQDCC	Deputy Director
Medekhgui NYAM-OCHIR	IACC	Deputy Chairman
Baatar ALTSUKH	MMRE	Senior officer, Fuel Policy Department
Radnaasumberel BADMAADORJ	NAMEM, NAQO	Assistant to director

(4) List of Trainees on Environmental Management (2012)

Name	Affiliation	Title
Nanzad Boldkhuu	Ministry of Energy	Director of Fuel Department
Abirmed Tseepil	Ministry of Environment and Green Development	Officers of Environment and Natural Resources Department
Chultemsuren BATSAIKHAN	AQDCC	Deputy Director
Shagdar Nyamdavaa	NAMEM, NAQO	Secretary of Air quality professional office
Nasan Shine-Orgil	IACC	Senior state inspector for Environment
B. Enkhbayar	EFDUC	Officer in charge of central heating system

ANNEX 4

(1) List of Provision of Equipment by JICA and its Present State (Fiscal year of 2010)

As of Nov.1.2012

No.	Equipments	Model	Q'ty	Price (Yen)	Price (Tg)	Arrival Date	Category	Present Condition
1	Ribbon Heater	HeaterEngineer C50-3020	2pcs	26,200		2010.11	F	U
2	Adjustable Transformer	Yamabishi S-260-5	2pcs	40,760		2010.11	F	U
3	Stainless Tube	MoryIndustries φ12×1m	10pcs	14,500		2010.11	F	U
4	Glass Sampling Tube	TGK 277-16-27-42	5pcs	10,350		2010.11	F	U
5	Heating Sampling Probe	MaruniScience NG11-H1	1set	129,820		2010.11	F	U
6	Silicon Tube	TogawaIndustry SS 8×12	100m	45,000		2010.11	F	U
7	Silicon Tube	TogawaIndustry SS 4×8	10m	4,000		2010.11	F	U
8	Teflon Tube	Nichias 9003-PFA-HG 8×10	200m	186,700		2010.11	F	U
9	Teflon Tube	Nichias 9003-PFA-HG 4×6	10m	5,150		2010.11	F	U
10	Silicone Blade Hose	TGK 125-17-17-33 #8	100m	205,200		2010.11	F	U
11	Vinyl Tube	TogawaIndustry S samplay	100m	9,140		2010.11	F	U
12	Heat-Resistant Ribbon	MaruniScience NG33-502	30m	20,380		2010.11	F	U
13	Heat-Resistant Tape	NittoDenko NO.903UL 10m	10pcs	25,800		2010.11	F	U
14	Pitot Tube (2m)	MaruniScience NG4-1010	1set	101,600		2010.11	F	U
15	Inclined Manometer	MaruniScience NG5-P1	1set	90,660		2010.11	F	U
16	U-Shaped Manometer	MaruniScience M2-1000	1set	27,890		2010.11	F	U
17	Pressure-Resistance Tube	TGK 125-17-08-11	10m	4,290		2010.11	F	U
18	Wind Speed Meter	MaruniScience V-02-AD500	1set	384,280		2010.11	F	U
19	Digital Thermometer	MaruniScience ERA-2000-1	1set	79,950		2010.11	F	U
20	Orzat Gas Analyzer	MaruniScience NG10A-3	1set	215,750		2010.11	F	U
21	Rubber pray, Double bulb	Imamura King spray No.8	1pc	1,120		2010.11	F	U
22	Water Bath	MaruniScience NG15-11	1pc	6,870		2010.11	F	U
23	Moisture Absorption Tube	MaruniScienceNG12-10 10pcs	2set	152,300		2010.11	F	U
24	Electronic Balance	Sartorius ELT402	1set	87,160		2010.11	F	U
25	Suction Pump	ULVAC DAP-30	1pc	60,070		2010.11	F	U
26	Dry Gas Meter (1L)	Shinagawa DC-1C-M	1pc	125,280		2010.11	F	U
27	Dry Gas Meter (5L)	Shinagawa DC-5C-M	1pc	140,200		2010.11	F	U
28	Dust SamplingHolder/Nozzle	MaruniScience NG21-120TC	1set	276,040		2010.11	F	U
29	Cylindrical Filter Case	MaruniScience NG26-10	1set	40,760		2010.11	F	U
30	Drain Separator	MaruniScience NGZ-19-3	2pcs	115,840		2010.11	F	U

31	Vacuum Pump100L/min	Satovac TST-100	1pc	171,660		2010.11	F	U
32	Silica Wool (10g)	TGK 788-30-33-03	10pcs	43,000		2010.11	F	U
33	Silica Thimble Filter	Whatman2812-259 (10pcs)	10set	74,000		2010.11	F	U
34	Glass Thimble Filter	Advantec No.86R (25pcs)	24set	312,000		2010.11	F	U
35	Storage Shed	InabaNEXTA NX-32S	1set	139,120		2010.11	F	U
36	Electrical Screwdriver	Black&Decker SX3000	1set	19,980		2010.11	F	U
37	Electric Heater	Densace EK-7G	1pc	53,880		2010.11	F	U
38	Sealing Tape	Nittodenko No.95S 5m	100pcs	5,000		2010.11	F	U
39	Silicon Greece	Toraydowcorning 50g	10pcs	12,900		2010.11	F	U
40	Mechanical Filter Respirator	Shigematsuworks DR28U2W	5pcs	19,000		2010.11	F	U
41	Heat-Resistant Gloves	TruscoNakayamaTMZ-626F	4pcs	26,400		2010.11	F	U
42	Stack Gas Analyzer	Hodaka HT-3000(CO,O2)	1set	2,323,000		2011.01	F	U
43	Heating Pipe 5m	ThermonFarEast Mtubetrace	1set	174,800		2011.01	F	U
44	Heating Pipe 10m	ThermonFarEast Mtubetrace	1set	174,800		2011.01	F	U
45	Heated Jackets for Sample Tube	HeaterEngineerφ20mm×1m	10pcs	270,000		2011.01	F	U
46	Portable Data Logger	Graphtec GL220	2set	231,690		2011.01	F/E	U
47	Dry Oven	TGK FINE FS-30P	1pc	153,000		2011.01	F	U
48	Auto-Dry Desiccator	TGK FH0-1	1pc	34,010		2011.01	F	U
49	Burette Stand	ASONE	1set	4,050		2011.01	F	U
50	Funnel Stand	ASONE WoodenFunnelStand	2pcs	1,880		2011.01	F	U
51	Spatula	TGK Stainless (3pcs)	1set	220		2011.01	F	U
52	Evaporating Dish included Crucible Scissors	TGK φ90 #2	10pcs	5,340		2011.01	F	U
53	Rubber Safe Pipetter	TGK Rubber	5pcs	4,750		2011.01	F	U
54	Filter Paper5A (100pcs)	Advantec No.5A 125mm	5set	8,800		2011.01	F	U
55	Filter Paper5C (100pcs)	Advantec No.5C 125mm	5set	8,800		2011.01	F	U
56	Beaker	AGCTechno Glass 100,200,500,1000ml	5set	8,700		2011.01	F	U
57	Volumetric Flask	AGCTechno Glass 50,250,500,1000mL JIS R3505-1994 ClassA	5set	33,700		2011.01	F	U
58	Volumetric Flask	AGCTechno Glass 100mL JIS R3505-1994 ClassA	10pcs	10,600		2011.01	F	U

59	Volumetric Pipet	AGCTechno Glass 1,5,10,20,50ml JIS R3505 ClassA	5set	10,850		2011.01	F	U
60	Measuring Pipet	AGCTechno Glass 5,10,25ml JIS R3505 ClassA	5set	8,550		2011.01	F	U
61	Graduated Cylinder	AGCTechno Glass 100mL	5pcs	5,000		2011.01	F	U
62	Graduated Cylinder	AGCTechno Glass 1000mL	2pcs	9,800		2011.01	F	U
63	Burette	AGCTechno Glass 50mL	2pcs	15,600		2011.01	F	U
64	Erlenmeyer Flask	AGCTechno Glass 200mL	5pcs	1,750		2011.01	F	U
65	Glass Funnelφ65mm	AGCTechno Glass	5pcs	4,900		2011.01	F	U
66	Glass Stick	TGK	10pcs	1,940		2011.01	F	U
67	Glass Wool 10g	TGK	2pcs	5,000		2011.01	F	U
68	Silica Gel	Wako Silica Gel (Blue) 500g	10pcs	13,500		2011.01	F	U
69	Calcium Chloride	Wako 500g	10pcs	24,500		2011.01	F	U
70	Ethanol (99.5%)	Wako 500g	6pcs	10,440		2011.01	F	U
71	Potassium Hydroxide	Wako 500g	6pcs	7,500		2011.01	F	U
72	Pyrogallol	Wako 500g	2pcs	23,200		2011.01	F	U
73	Methyl Orange Solution	Wako 500mL	1pc	2,050		2011.01	F	U
74	Hydrochloric Acid	Wako 500mL	8pcs	5,600		2011.01	F	U
75	Sodium Chloride	Wako 500g	6pcs	4,200		2011.01	F	U
76	Sulfuric Acid	Wako 500mL	4pcs	2,960		2011.01	F	U
77	Acetic Acid	Wako 500mL	2pcs	1,560		2011.01	F	U
78	Lead(II)Acetate Trihydrate	Wako 500g	2pcs	4,800		2011.01	F	U
79	Barium Acetate	Wako 500g	2pcs	5,560		2011.01	F	U
80	Bromophenol Blue Solution	Wako 500mL	1pc	2,260		2011.01	F	U
81	ArsenazoIII	Kanto Chemical 5g	2pcs	62,000		2011.01	F	U
82	2-Propanol	Wako 500mL	10pcs	6,900		2011.01	F	U
83	Sodium Carbonate	Wako 50g	2pcs	7,300		2011.01	F	U
84	Sulfuric Acid (N/10)	Wako 500mL	4pcs	3,400		2011.01	F	U
85	Hydrogen Peroxide	Wako 500mL	10pcs	7,700		2011.01	F	U
86	Sodium Carbonate	Wako 500g	10pcs	11,200		2011.01	F	U
87	Sodium Hydroxide	Wako 500g	10pcs	10,000		2011.01	F	U
88	Sodium Formate	Wako 500g	1pc	2,270		2011.01	F	U
89	Copper(II)Sulfate Pentahydrate	Wako 500g	1pc	1,730		2011.01	F	U

90	Sulfanilamide	Wako 500g	1pc	11,800		2011.01	F	U
91	N-1 Naphthylethylenediamine Dihydrochloride	Wako 25g	2pcs	14,060		2011.01	F	U
92	Sodium Nitrite	Wako 500g	1pc	1,500		2011.01	F	U
93	Nitrite Ion Standard Solution	Wako 50mL	2pcs	14,200		2011.01	F	U
94	Clamp-on Circuit Tester	Hioki 3288	1set	23,850		2011.01	E	U
95	Portable Radiation Thermometer	Hioki 3419	1set	13,240		2011.01	E	U
96	Current Sensor Clamp Type	URD	4set	78,400		2011.01	E	U
97	Pressure Sensor and Power supply	NaganoKeiki	4set	456,100		2011.01	E	U
98	Surface Temperature Meter	FUSO 308r	1set	13,970		2011.01	E	U
99	Ultrasonic Leak Detector	EXAIR	1set	80,800		2011.01	E	U
100	IR Thermography	NEC Avio ThermoShotF30W	1set	576,680		2011.01	E	U
101	Vibration Detector	Yamatake AAM-PWPCH002	1set	122,400		2011.01	E	U
102	Portable Ultrasonic Flow Meter	TokyoKeiki UFP-20	1set	1,047,630		2011.01	E	U
103	Portable Power Meter	Hioki 3169	1set	315,880		2011.01	E	U
104	Coated Wire	100m	2pcs	30,600		2011.01	E	U
105	Carrying Case	ASONE T3AA	4set	16,800		2011.01	E	U
106	Automatic Dust Sampler (Isokinetic Sampling)	MaruniScience NGZ-5DK	1set	3,828,300		2011.02	F	U
107	Gas Pressure Regulator	S1-1VR-1G8G-B1N1	6pcs	396,000		2011.02	F	U
108	Wet Gas Meter (1L)	Shinagawa W-NK-1A	1set	208,600		2011.02	F	U
109	Wet Gas Meter (5L)	Shinagawa W-NK-5A	1set	316,500		2011.02	F	U
110	Suction Pump (15L/min)	MaruniScienceNG17N-015-5	1set	188,300		2011.02	F	U
111	Bubbler with Filteration Board	Shibata 84GP160	4pcs	52,000		2011.02	F	U
112	Vacuum Sampling Flask	MaruniScience NG81-N61	4pcs	92,000		2011.02	F	U
113	Digital Manometer	Hodaka HT-1500NM	1set	28,000		2011.02	F	U
114	Tedlar Bag	1L	10pcs	9,400		2011.02	F	U
115	Syringe(100mL)	MaruniScience NG81-N72	1pc	13,200		2011.02	F	U
116	Precision Balance	MettlerTolede MS104S	1set	386,300		2011.02	F	U
117	Water Bath	AdvantecToyo TBM206AA	1set	108,630		2011.02	F	U

118	Spectrophotometer	ThermoScientific SPECTRONIC 20 GENESYS	1set	450,000		2011.02	F	U
119	Quartz Cell	TGK 10mm,50mm	2set	52,000		2011.02	F	U
120	Vacuum Pump Oil	MR-100 Neoback(4L)	1pc	5,500		2011.02	F	U
121	Auti-Freeze Coolant 20L	E-17 Non-amine LLC	1pc	7,600		2011.02	F	U
122	Plastic Bottle (250mL)	Wide Mouth	100pcs	7,000		2011.02	F	U
123	Rope (20m)	Vinylon rope(3strokes type)	5pcs	19,400		2011.02	F	U
124	Down Transformer	Yamabishi YTC-100-3K	1set	12,000		2011.02	F	U
125	Waste Clothes	20kg	2pcs	8,000		2011.02	F	U
126	Washing Bottle	1L	10pcs	3,500		2011.02	F	U
127	Digital Multimeter	Hioki 3803	1set	15,000		2011.02	F	U
128	Safety belt	TrascoNakayama GR-590	5pcs	37,500		2011.02	F	U
129	Eye Protector	TrascoNakayama TVF-SG	5pcs	8,000		2011.02	F	U
130	Multi Gas Monitor	NewCosmosElectricXOC-2200	1set	96,000		2011.02	F	U
131	Smoke Tester	Hodaka HT-1650	1set	28,600		2011.02	E	U
132	Adjustable Angle Wrench	Lobtex (M200,M250)	1set	4,200		2011.02	E	U
133	Adjustable Pipe Wrench	Lobtex PWA-200	1pc	2,000		2011.02	E	U
134	Screw Driver +	Vessel No.600-2-150	1pc	600		2011.02	E	U
135	Cutter	OLFA OF-LBN	1pc	500		2011.02	E	U
136	Cutting Pliers	Merry 1050H-175	1pc	1,900		2011.02	E	U
137	Scissors	Engineer PH-51	1pc	1,400		2011.02	E	U
138	Bushing	1/4×3/8,1/4×1/2,1/2×3/4	4set	5,600		2011.02	E	U
139	Socket	Rc1/4,Rc3/8,Rc1/2,Rc3/4	4set	7,000		2011.02	E	U
140	Half Union	SMC KQ2H06-02S	10pcs	2,000		2011.02	E	U
141	Nylon Tube	SMC T0806B-20	1pc	2,600		2011.02	E	U
142	Connector Plug	Kashimura	4pcs	1,200		2011.02	E	U
143	Hypsometer	Nikon Laser550AS	2set	140,000		2011.02	S	U
144	Fortran Compiler	IntelVisualFortranCompiler11.1	1pc	96,000		2011.02	S	U
145	Operation System	Windows 7 Professional Edition	1pc	35,000		2011.02	S	U
146	Office Software	MS Office professional 2007	1pc	55,000		2011.02	S	U
147	Anti-Virus Software	Norton Internet Security 2011	1pc	9,600		2011.02	S	U
148	Standard Gas 10pcs	N_2,O_2,CO,CO_2,SO_2,NO	1set	580,000		2011.03	F	U
149	Portable Stack Gas Analyzer	Horiba PG250,PS200	1set	3,880,000		2011.05	F	U
150	Portable Gas Analyzer	TESTO 350M/XL	1set			2010.11	F/E	U
151	Standard Gas	(N_2,O_2,CO,CO_2,SO_2,NO)	1set			2010.11	F	U
152	Gas Pressure Regulator	GENTEC R14SLGK DKG-63-15	6pcs			2010.11	F	U

153	Generator	KIPOR IG2000S	2pcs			2010.11	F	U
154	Power Cable Reel	WURTH 40m	4pcs			2010.11	F	U
155	Power Strip	ROTOR (China)	5set			2010.11	F	U
156	Basket	Plastic 30L	5pcs			2010.11	F	U
157	Tool Set		1set			2010.11	F	U
158	Digital Scale		1pc			2010.11	F/E	U
159	Bucket	Plastic 20L	2pcs			2010.11	F/E	U
160	Radio Transceiver	Monel	4pcs			2010.11	F	U
161	Helmet	Youngjin (Korea)	5pcs			2010.11	F	U
162	Winter Clothe		5pcs			2010.11	F	U
163	Notebook Computer	Acer Aspire4738	1set			2011.02	F	U
164	UPS	OPTI UPS 1500C	1set			2011.02	F	U
165	Heat-insulating Material	Aluminum polyurethane	5pcs			2011.02	F	U
166	Heat-insulating Sheet	Aluminum polyurethane	5pcs			2011.02	F	U
167	Arctic Boots	Georgia boots	5pcs			2011.02	F	U
168	Notebook Computer	Acer Aspire 4738-5462G50	1set	65,940	999,090	2011.02	B/I	U
169	Copy Machine	Sharp AR-5520D	1set	154,635	2,454,527.28	2010.11	B/I	U
170	GIS Soft	ESRI ArcView Single Use	1set	303,466		2011.01	B/I	U
171	Printer	HP Officejet7000 wide format	1set	29,940	453,636	2011.02	B/I	U
172	Printer INK for HP	HP 920XL Black×3, Cyan,×1 Magenta,×1 Yellow×1	6pcs	15,444	234,000	2011.02	B/I	U
173	Projector	View Sonic PJD6241	1set	95,940	1,453,636.36	2011.02	B/I	U
174	UPS	OPTI ES800C	1set	9,893	149,900	2011.02	B/I	U
175	Toner for Copy machine	Sharp AR-020ST	2pcs	9,162	145,436.36	2010.11	B/I	U
176	Lamp for Projector	View Sonic RLC-049	2pcs	42,000	636,363.64	2011.02	B/I	U
177	Digital Camera	Nikon COOLPIX S1000pj	2set	47,999	727,254.55	2011.02	B/I	U
178	GPS	Garmin GPSMap60CSx	2set	102,097	1,570,727.28	2010.09	B/I	U
179	Video Camera	JVC GZ-HD620	2set	119,880	1,816,362	2011.02	B/I	U
180	Tripod for Video Camera	Yunteng VCT880RN	2pcs	15,708	238,000	2011.02	B/I	U

F: Flue gas measurement E: Energy Saving Survey B: Boiler Registration System I: Simulation

N: Don't Use, but equipment will be utilized this fiscal year U: Utilized

Note: Price is not included IVA and TAX. Unit price multiplied by quantity is Price

(2) List of Provision of Equipment by JICA and its Present State (Fiscal year of 2011)

As of Nov.1.2012

No.	Equipments	Model	Q'ty	Price	Arrival	Category	Present

				(Yen)	Date		Condition
1	Automatic Dust Sampler (Isokinetic Sampling)	MaruniScience M2-700DS	1set	3,754,600	2012.03	F	U
2	Dust SamplingHolder/Nozzle set	MaruniScience NG21-120	1set	168,350	2012.03	F	U
3	Dust Sampling Nozzle set	MaruniScience NG25-4U	1set	240,850	2012.03	F	U
4	Cylindrical Filter Case	Strage Case	1set	44,500	2012.03	F	U
5	Portable Stack Gas Analyzer	Horiba PG250,PS200	1set	4,298,900	2012.03	F	U
6	Portable Data Logger	For Horiba PG250	1set	126,700	2012.03	F	U
7	Ribbon Heater	Silicon Rubber	2pcs	15,200	2012.03	F	U
8	Heating Sampling Probe	For Fuel gas	1pc	116,100	2012.03	F	U
9	Heating Pipe 5m	With thermo control	2pcs	927,800	2012.03	F	U
10	Moisture Absorption Tube	Okano EW-32	8pcs	53,600	2012.03	F	U
11	Electronic Balance	Accuracy 10mg	1set	56,100	2012.03	F	U
12	Drain Separator	3Trap	2pcs	125,600	2012.03	F	U
13	Suction Pomp	Alvac DA-30S	1pc	66,000	2012.03	F	U
14	Vacuum Pump	Alvac DA-60S	1pc	90,000	2012.03	F	U
15	Dry Gas Meter (1L)	Shinagawa DC-1C-M	1pc	170,500	2012.03	F	U
16	Dry Gas Meter (5L)	Shinagawa DC-5C-M	1pc	46,400	2012.03	F	U
17	Pitot Tube	For Fuel gas velocity	1pc	75,000	2012.03	F	U
18	Inclined Manometer	For Fuel gas velocity	1pc	118,700	2012.03	F	U
19	Multi Gas Monitor	CO, O2	1pc	104,400	2012.03	F	U
20	Cylinder Stand	For 10L Cylinder 3pcs	2pcs	41,000	2012.03	F	U
21	Desktop Vibration Isolator	For Precision Balance	1台	64,500	2012.03	F	U
22	Ultrasonic Cleaners	AU-30C	1set	91,300	2012.03	F	U
23	Silica Gel	Silica Gel (Blue) 500g	10pcs	15,000	2012.03	F	U
24	Calcium Chloride	500g 3.4L Cylinder	10pcs	28,000	2012.03	F	U
25	Standard Gas SO2	190ppm 3.4L Cylinder	1pc	58,700	2011.12	F	U
26	Standard Gas SO2	950ppm 3.4L Cylinder	1pc	58,700	2011.12	F	U
27	Standard Gas NO	190ppm 3.4L Cylinder	1pc	58,700	2011.12	F	U
28	Standard Gas NO	900ppm 3.4L Cylinder	1pc	58,700	2011.12	F	U
29	Standard Gas CO	190ppm 3.4L Cylinder	1pc	55,700	2011.12	F	U
30	Standard Gas CO	9% 3.4L Cylinder	1pc	55,700	2011.12	F	U
31	Standard Gas CO	1800ppm 3.4L Cylinder	1pc	55,700	2011.12	F	U
32	Standard Gas CO2	14.5% 3.4L Cylinder	1pc	53,700	2011.12	F	U
33	Standard Gas O2	21.5% 3.4L Cylinder	1pc	53,700	2011.12	F	U
34	Standard Gas N2	99.999% 3.4L Cylinder	1pc	52,000	2011.12	F	U

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F: Flue gas measurement U: Utilized

Note: Price is not included IVA and TAX. Unit price multiplied by quantity is Price

(3) List of Equipment Carried by JICA and its Present State (Fiscal year of 2011)

As of Nov.1.2012

No.	Equipments	Model	Q'ty	Price (Yen)	Price (Tg)	Arrival Date	Category	Present Condition
1	Standard Gas	(N_2,O_2,CO,CO_2,SO_2,NO)	1set	449,633		2011.11	F	U
2	Notebook Compute	For PG250	1pc	70,740	1,179,000	2011.10	F	U
3	Sensor for TESTO350	O2,CO,NO,NO2,SO2 Sensors	1set	178,378	3,185,325	2012.01	E	U
4	Soft Wear	VisualStudio2010 Professional	1pc	100,200		2011.07	B	U
5	Office Software	MS Office 2010 Professional	1pc	46,500		2011.05	B	U
6	Computer	ACER Veriton M265-73	1pc	89,594	1,599,900	2012.02	S	U
7	GIS Soft	Arc View	1pc	236,376		2011.12	S	U

F: Flue gas measurement E: Energy Saving Survey B: Boiler Registration System S: Simulation

N: Don't Use, but equipment will be utilized this fiscal year U: Utilized

Note: Price is not included IVA and TAX. Unit price multiplied by quantity is Price

(4) List of Provision of Accessory(Unit price is under ¥50,000) Purchased by JICA and its Present State (Fiscal year of 2010)

As of Nov.1.2012

No.	Equipments	Model	Q'ty	Price (Yen)	Price (Tg)	Arrival Date	Category	Present Condition
1	Working Gloves and Clasp		28pcs	1,291	19,860	2010.08	F	U
2	Water tank and Funnel	For wet gas meter	1set	260	4,000	2010.08	F	U
3	Level	For wet gas meter	1pc	228	3,500	2010.08	F	U
4	Rope	30m	1pc	1,950	30,000	2010.08	F	U
5	Safety Belt		4pcs	11,700	180,000	2010.08	F	U
6	Lubricant		1pc	347	5,500	2010.09	F	U
7	Folding chair	For 現場測定用	11pcs	8,943	141,950	2010.09	FEB	U
8	Laser Pointer		2pcs	756	12,000	2010.10	FESB	U
9	Hose		9pcs	176	28,000	2010.11	F	U
10	Steel Shelf	For Keeping Equipment	2pcs	8,820	140,000	2010.11	FE	U

11	Working Stand		2pcs	12,109	192,200	2010.11	FE	U
12	Tripod		1pc	6,237	99,000	2010.11	FE	U
13	Handcart		2pcs	27,619	438,400	2010.11	FE	U
14	Gasoline Tank and Filter Pump for Generator		1set	7560	120,000	2010.11	F	U
15	Electric Blanket		1pc	2,520	40,000	2010.11	F	U
16	Basket		8pcs	2,291	34,200	2010 .12	FEB	U
17	Measurement Scale		6pcs	2,010	30,000	2010.12	FEB	U
18	Stepladder		1pc	12,395	185,000	2010.12	FEB	U
19	Soldering Iron	Soldering Iron and Solder	1set	724	10,800	2010.12	FE	U
20	Shelf	For Keeping Equipment	2pcs	20,100	300,000	2011.01	FE	U
21	SD card	For Digital Camera	4pcs	11,796	155,958	2011.02	FESB	U
22	Other Consumables	A4paper,Paste,CD-R etc.	1set	78,913	1,214,039		FESB	U

F: Flue gas measurement E: Energy Saving Survey B: Boiler Registration System S: Simulation I: Simulation U: Utilized

Note: Price is not included IVA and TAX. Unit price multiplied by quantity is Price

(5) List of Provision of Accessory(Unit price is under ¥50,000) Purchased by JICA and its Present State (Fiscal year of 2011)

As of Nov.1.2012

No.	Equipments	Model	Q'ty	Price (Yen)	Price (Tg)	Arrival Date	Category	Present Condition
1	Coated Wire for Table Tap	For -40℃15m 2PNCT	1pc	7,050		2011.05	F	U
2	Electric Blanket	Sanyo	4pcs	28,616		2011.05	F	U
3	Plastic Tank with Cock	KN3340486 20L	2pcs	5,000		2011.05	F	U
4	Nitrile Rubber Glove	19-050-550C 100pcs	10set	16,000		2011.05	F	U
5	Operation System	Windows 7 Professional	1pc	35,816		2011.05	B	U
6	Anti-Virus Software	Symantec Norton360	4pc	6,254		2011.05	FSB	U
7	Toner for Copy machine	Kyocera Mita TK-410	2pcs	9,503	143,982	2011.06	S	U
8	Adjustable Transformer	P-105	2pcs	12,600		2011.08	F	U
9	Down Transformer	Swallow PAL-1500EP	2pcs	75,500		2011.08	F	U
10	Iron Rod		28pcs	3,472	56,000	2011.09	F	U
11	Windows7 Professional		1pc	18,780	313,000	2011.10	I/S	U
12	Water Bath	MaruniScience	1pc	7,225		2011.10	F	U

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		NG15-11						
13	Thimble Filter (Quartz)	ADVANTECNO.88RH 10pcs	30set	249,210		2011.10	F	U
14	Silicone Grade Hoses	9.5x 16.5 mm x10m	1pc	24,800		2011.10	F	U
15	Teflon Tube	4x 6 mm x10 m	1pc	5,100		2011.10	F	U
16	Silicone Tube	5x 9mm x 10m	1pc	3,825		2011.10	F	U
17	Silicone Tube	7x 12mm x10m	1pc	9,350		2011.10	F	U
18	Temp/Hum/Pressure Data Logger	T&D TR-73U	1set	35,435		2011.10	F	U
19	Glass Tube Cutter	ASONE	1pc	2,635		2011.10	F	U
20	Tube Cutter	ASONE 1-6751-01	1pc	1,990		2011.10	F	U
21	Microburet (5mL)	ASONE JIS R3505ClaasA	1pc	6,072		2011.10	F	U
22	Support Base for Microburet	ASONE	1pc	5,000		2011.10	F	U
23	Digital Manometer	Hodaka HT-1500NH	1pc	47,500		2011.10	F	U
24	Measurement Scale	Sanko 20kg	1pc	4,477		2011.10	F	U
25	Tool Box	RIngStar RSD-350	1pc	4,362		2011.11	F	U
26	Adjustable Angle Wrench	Lobtex UM40X	1pc	4,200		2011.11	F	U
27	Adjustable Pipe Wrench	Lobtex UM36X	1pc	3,400		2011.11	F	U
28	Adjustable Pipe Wrench	EngineerTWM-04	1pc	1,819		2011.11	F	U
29	Adjustable Pipe Wrench	HIT PW300	1pc	7,922		2011.11	F	U
30	Adjustable Pipe Wrench	MCC PW-SD200	1pc	2,724		2011.11	F	U
31	Box wrench	Deen mm 6pcs	1set	8,477		2011.11	F	U
32	Screw Driver +No.2	Vessel 225-P2	1pc	542		2011.11	F	U
33	Screw Driver +No.1	Vessel 220-P1	1pc	352		2011.11	F	U
34	Screw Driver +No.0	Vessel 610-P0	1pc	304		2011.11	F	U
35	Screw Driver +No.00	Vessel 610-P00	1pc	295		2011.11	F	U
36	Screw Driver -No.6	Vessel 220-6	1pc	514		2011.11	F	U
37	Screw Driver -No.5.5	Vessel 220-5.5	1pc	352		2011.11	F	U
38	Screw Driver -No.4	Vessel 610-4	1pc	295		2011.11	F	U
39	Screw Driver 6pcs	Engineer DK-60	1set	905		2011.11	F	U
40	combination Pliers	Fujiya 1050-175	1pc	2,200		2011.11	F	U
41	Needle-nose pliers	Fujiya 350-150	1pc	1,809		2011.11	F	U
42	Case for sampling probe	Aluminum Case AL-L	1pc	7,600		2011.11	E	U
43	Basket	Plastic	5pcs	10,150	175,000	2011.11	F	U

44	Handcart		1pc	5,220	90,000	2011.11	F	U
45	Gasoline	For Generator	33.8L	3,469	58,800	2011.12	F	U
46	Digital Thermometer	Chino MC-1000	1pc	40,800		2012.01	E	U
47	Electric Heater	Apice ACH-318-RD	1pc	1,680	30,000	2012.01	F	U
48	Spare Filter	For TESTO350 20pcs	1set	1,736	31,000	2012.01	FE	U
49	Stationary	A3,A4paper Printer Ink	1set	177,772	2,820,985		FESB	U
50	Other Consumables	Office equipments, etc	1set	114,568	1,818,542		FESB	U

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Note: Price is not included IVA and TAX. Unit price multiplied by quantity is Price

(6) List of Provision of Accessory(Unit price is under ¥50,000) Purchased by JICA and its Present State (Fiscal year of 2012)

As of Nov.1.2012

No.	Equipments	Model	Q'ty	Price (Yen)	Price (Tg)	Arrival Date	Category	Present Condition
1	Toner for Copy machine	Kyocera Mita TK-410	2pcs	8,804	142,000	2012.09	FESB	N
2	High Pressure Flowmeter	Kofloc RK1400-25-SS -1/4-Air-2L/min-N	1pc	26,000		2012.09	F	N
3	High Pressure Flowmeter	Kofloc RK1400-25-SS-1/4 -Air-20L/min-N	1pc	26,000		2012.09	F	N
4	Pressure Gauges	YAMAMOTO ECTRORIC WORKS WO81FN200D	1pc	16,000		2012.09	E	U
5	Infrared Thermometer	Hioki FT3710	1pc	11,000		2012.09	E	U
6	Digital Thermometer	Fuso308	1pc	12,100		2012.09	E	U
7	Stainless Tube(SUS304)	10x 12mm x1m	10pcs	26,000		2012.09	FE	N
8	Silicone Tube	4x8mm x10m	1pc	4,100		2012.09	FE	N
9	Silicone Tube	5x9mm x10m	1pc	4,100		2012.09	FE	N
10	Silicone Tube	7x12mm x10m	1pc	9,500		2012.09	FE	N
11	K type Thermocouple	φ1.6mm x 1m with 10m extension lead wire	4pcs	21,600		2012.10	E	U

12	K type Thermocouple	Φ3.2mm x 1m with 10m extension lead wire	2pcs	11,000		2012.10	E	U
13	Extension Lead Wire	50m	4pcs	136,000		2012.10	E	U
14	Standard Gas	(N_2,O_2,CO,CO_2,SO_2, NO)	1set	474,593		2012.10	F	N
15	Anti-Virus Software	Symantec Norton360 Ver6.0	2pcs	10,820		2012.08	SB	U
16	Other Consumables	Stationary, etc	1set	6,956	112,200		FESB	U

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ANNEX 5: Project Cost borne by Japanese Side

(Unit: Japanese Yen)

Category	2010			2011				2012			Total
	Mar-Jun	Jul-Sep	Oct-Dec	Jan-Mar	May-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Aug-Oct	
Air ticket	0	0	0	0	0	0	0	0	0	0	0
Car rental	1,248,300	936,200	936,200	936,200	574,900	862,400	862,400	862,400	862,400	1,436,400	9,517,800
Contract with Consultant	0	1,896,900	1,896,900	1,138,200	2,300	3,400	3,400	3,400	3,400	0	4,947,900
Contract with local NGO	0	0	0	0	0	0	0	0	0	0	0
Allowance	994,900	746,200	746,200	746,200	426,100	639,100	639,100	639,100	639,100	1,189,600	7,405,600
Meeting	85,700	64,300	64,300	64,300	23,400	35,200	35,200	35,200	35,200	206,200	649,000
Others	406,400	304,800	304,800	304,800	545,500	818,200	818,200	818,200	818,200	2,760,600	7,899,700
Total	2,735,300	3,948,400	3,948,400	3,189,700	1,572,200	2,358,300	2,358,300	2,358,300	2,358,300	5,592,800	30,420,000

1 MNT ≒ 0.058～0.069 Yen

ANNEX 6 List of Counterpart Personnel
(Working Group Members / Participants)

Activity	Counterpart Working Group Members / Participants	Affiliation	Title	Approved Date
Output1 Air Quality Evaluation Capacity (Emission Inventory, Simulation etc.)				
Stationary Source Inventory	Mr. SEDED	AQDCC	Officer of Hot-Water Boiler and Heating Supply System	June 4, 2010
	Ms. ENKHMAA	NAMEM	Officer Environment Monitoring Strategy and Planning Division	
	Mr. BOLDKHUU	ME	Director of Fuel	
	Ms. TSEEPIL	MNEGD	Officer for environmental pollutions, Department of Environment and Natural Resource management	
	○Mr. DAVAAJARGAL	AQDCC	Officer	Recommended
	Mr. GALIMBEK	AQDCC	Officer	Recommended
	Ms. TSATSRAL	AQDCC	Officer	Recommended
Mobile Source Inventory	○Mr. ALTANGEREL	AQDCC	Officer in charge of automobile sourced pollution	June 4, 2010
	○Ms. ENKHMAA	NAMEM	Officer Environment Monitoring Strategy and Planning Division	
	Mr. UNURBAT	NAQO	Officer	Recommended
	Ms. NYAMDAVAA	NAQO	Officer	Recommended
Other Area Source Inventory	Mr. ALTANGEREL	AQDCC	Officer in charge of automobile sourced pollution	June 4, 2010
	○Ms. SANCHIRBAYAR	AQDCC	Officer in charge of infrastructure and urban planning	
	○Ms. ENKHMAA	NAMEM	Officer Environment Monitoring Strategy and Planning Division	
	Ms. NYAMDAVAA	NAQO	Officer	Recommended
Simulation	○Mr. DAVAAJARGAL	AQDCC	Officer	June 4, 2010
	Ms. BAYASGALAN	AQDCC	Officer	
	Ms. URANTSETSEG	AQDCC	Officer	
	○Ms. ENKHMAA	NAMEM	Officer Environment Monitoring Strategy and Planning Division	
	○Mr. BAYARMAGNAI	NAMEM, NAQO	Officer	
	Ms. OYUNCHIMEG	NAMEM, IHM	Officer	
	Mr. BATJARGAL	NAMEM, IHM	Officer	
	Mr. LODOYSAMBA	NUM	Head, Department of Electronics, School of IT / Head, Instrumentation Section, Nuclear Research Center	
	○Mr. BARKHASRAGCHAA	CLEM	Senior Engineer	
	○Mr. OTGONBAYAR	AQDCC	Officer	Recommended
	Mr. GALIMBEK	AQDCC	Officer	Recommended
	Ms. TSATSRAL	AQDCC	Officer	Recommended

Activity	Counterpart Working Group Members / Participants	Affiliation	Title	Approved Date
Output 2 Emission Regulation Capacity (Stack Gas Measurement, Pilot Inspection etc.)				
Stack Gas Measurement	○Mr. DAVAAJARGAL	AQDCC	Officer	April 28, 2010
	○Mr. BAYARMAGNAI	NAQO	Officer	
	Mr. ELDEMBILEG	CLEM	Engineer	
	Mr. ENKHTUVSHIN	PP2	Boiler engineer	
	Mr. ALTANGEREL	PP4	Maintenance worker of Boiler System	
	Mr. MUNKHTULGA	PP4	Maintenance worker of Boiler Section	
	Mr. BATBAATAR	PP3		Recommended
	○Mr. OTGONBAYAR	AQDCC	Officer	
Pilot Inspection	○Mr. DAVAAJARGAL	AQDCC	Officer	April 28, 2010
	Mr. BAYARMAGNAI	NAQO	Officer	
	Mr. ELDEMBILEG	CLEM	Engineer	
	Mr. ENKHTUVSHIN	PP2	Boiler engineer	
	Mr. ALTANGEREL	PP4	Maintenance worker of Boiler System	
	Mr. MUNKHTULGA	PP4	Maintenance worker of Boiler Section	
	Mr. BATBAATAR	PP3		Recommended
	○Ms. ENKHMAA	NAMEM	Officer Environment Monitoring Strategy and Planning Division	
	○Mr. NYAMDORJ	IACC	Head of the environment, tourism, geology and mining inspection department, Consultant engineer of Mongolia	
	○Mr. OTGONBAYAR	AQDCC	Officer	
Output3 Emission Regulation Capacity (Boiler Registration System, Permission or Certification etc.)				
Boiler Registration System (Institutional) Permission or Certification	○Mr. BATSAIKHAN	AQDCC	Deputy Director, Doctor	June 30, 2010
	Mr. TSOGTSAIHAN	UDPDM OCC	Officer of the Urban Development Policy Department	
	Ms. TSEEPIL	MNEGD	Officer for environmental pollutions, Department of Environment and Natural Resource management	
	Mr. MUNKHSAIKHAN	NIA		
	Ms. ULZIITSETSEG	IACC		
Boiler Registration Database	Mr. BATBILEG	EPWMD		
	Ms. ENKHMAA	NAMEM	Officer Environment Monitoring Strategy and Planning Division	
	Mr. GAN-OCHIR	EFDUC		

Activity	Counterpart Working Group Members / Participants	Affiliation	Title	Approved Date
	Mr. ZANDANPUREV	HSRA	Director	
	Mr. SONINBAYAR	PP2		
	Mr. BURIAD	PP4		
	Mr. BOLDSAIHAN	PP3	Planning and Environment Engineer in Technical and Management Department	Recommended
	○Mr. GALIMBEK	AQDCC	Officer	Recommended
	Ms. TSATSRAL	AQDCC	Officer	Recommended
Output4 Control Measures Investigation Capacity (Energy Conservation Diagnosis, Control Measures etc.)				
Energy Conservation Diagnosis and Control Measures	○Mr. SEDED	AQDCC	Officer of Hot-Water Boiler and Heating Supply System	June 30, 2010
	Mr. SONINBAYAR	PP2		
	Mr. BOLDSAIHAN	PP3	Planning and Environment Engineer in Technical and Management Department	
	Mr. BURIAD	PP4		
	Mr. ZANDANPUREV	HSRA	Director	
	Mr. GAN-OCHIR	EFDUC		
	Dr. BATTUR	University of Science and Technology		
	○Dr. TSEYEN-OIDOV	University of Science and Technology	Director, Ph.D, professor, Mongolian consulting engineer	
	Mr. OTGON	Mongolian Railway United Center for Construction, Industry and Service		
	○Ms. TSOLMON	AQDCC	Senior officer for electrical supply	Recommended
	○Ms. ENKHTSETSEG	PP4		
Output 5 Contribution to Air Pollution Control Program (Policy and Administration)				
Air Pollution Control Policy and Administration	○Mr. BATSAIKAHN	AQDCC	Deputy Director, Doctor	Jun. 28, 2010
	Ms. ULZIITSETSEG	IACC		
	Ms. ENKHMAA	NAMEM/ NAQO	Officer Environment Monitoring Strategy and Planning Division	
	Mr. TSOGTSAIKHAN	UDPDM OCC	Officer of the Urban Development Policy Department	Recommended
	Mr. BATBILEG	EPWMD		

Activity	Counterpart Working Group Members / Participants	Affiliation	Title	Approved Date
	Mr. NYAMDORJ	IACC	Head of the environment, tourism, geology and mining inspection department, Consultant engineer of Mongolia	
	Mr. BOLDKHUU	ME	Director, Fuel Division	
	Ms. DAVAASÜREN	ME	Senior Officer, Fuel Division	
	Ms. BOLORMAA	MCUD	Senior Officer, Urban Development and Land Affairs Policy Department	
	○Ms. TSOLMON	AQDCC	Senior officer for electrical supply	
	Mr. ALTSUKH	ME		
	Ms. BADMAADORJ	NAQO		
	Mr. NYAM-OCHIR	IACC		
	Ms. TSEEPIL	MNEGD		

○: Key persons

ANNEX 7 List of Training and Workshop

Name of Seminars, Workshops and Trainings	Targets	Number of Participants	Date	Related Outputs	Results of Questionnaire
Workshop on Inception Report	C/P and C/P-WG	41	2010/4/9	Output1 to 5	—
Workshop on Boiler Registration and Permission System and Pollutant Source Inventory	C/P and C/P-WG related to Output 1 and 3	26	2010/6/25	Output1, 3	—
Training Course on Stack Gas Measurement in Japan	C/P and C/P-WG related to Output 2	8	2010/7/14 to 8/12 (30 days)	Output 2	—
Training on Equipment Operation Procedure and Calculation Method for Stack Gas Measurement	C/P and C/P-WG related to Output 2	8	2010/8/31 to 9/22 (6 days)	Output 2	—
Lecture on Air Pollution Control Measures	C/P, C/P-WG, HOB Operators, HOB manufacturer, Power Plants and Railway Company related to Output 4	11	2010/10/5 to 10/7 (3 days)	Output 4	①
Lecture on Energy Conservation	C/P, C/P-WG, HOB Operators, HOB manufacturer, Energy Company, Power Plants and Building Owners related to Output 4	5	2010/10/11	Output 4	②
Training Course on Air Pollution Administration in Japan (1st Year)	C/P and C/P-WG related to Output 3, 4, 5	5	2010/10/16 to 30 (15 days)	Output 3, 4, 5	—
Field Training on Stack Gas Measurement (2010 to 2011 Winter Season)	C/P and C/P-WG related to Output 2	8	2010/11/24 to 12/27 (11 days) 2011/1/19 to 3/21 (26 days)	Output 2	—
Training on Boiler Heat Management (Power Plant Boiler)	C/P, C/P-WG, Power Plants and University etc. related to Output 4	11	2010/12/9	Output 4	—
Training on Boiler Heat Management (HOB)	C/P, C/P-WG, HOB Operators, HOB Manufacturers and Railway Company etc. related to Output 4	18	2010/12/14 to 12/15 (2 days)	Output 4	—
Seminar on Boiler Registration System	C/P, C/P-WG, HOB Operators and HOB Manufacturers related to Output 3, 5	26	2011/2/11	Output 3, 5	—
Lecture on Boiler Management (Power Plant Boiler)	C/P, C/P-WG, Power Plants and University etc. related to Output 4	17名	2011/2/24	Output 4	③
Lecture on Boiler Management (HOB)	C/P, C/P-WG, HOB Operators and HOB Manufacturers related to	8	2011/3/2	Output 4	④

	Output 4				
Workshop on Pollutant Emission Inventory and Simulation	C/P and C/P-WG related to Output 1	14	2011/3/4	Output 1	—
Field Training on Detailed Energy Conservation Diagnosis (1st)	C/P and C/P-WG related to Output 4	3	2011/3/10 to 3/11 (2 days)	Output 4	—
Lecture and Training on Wet Analysis Method	C/P and C/P-WG related to Output 2	10	2011/5/30 to 6/3 (4 days)	Output 2	—
Training on Pollutant Emission Inventory and Simulation	C/P and C/P-WG related to Output 1	15	2011/6/6, 6/7, 6/15 and 6/23 (4 days)	Output 1	—
Field Training on Detailed Energy Conservation Diagnosis (2nd)	C/P and C/P-WG related to Output 4	1	2011/6/8 and 6/11 (2 days)	Output 4	—
Workshop on Pollutant Emission Inventory and Simulation	C/P and C/P-WG related to Output 1	15	2011/6/13	Output 1	—
Workshop and Explanation Meeting on Boiler Registration System (1st)	C/P, C/P-WG, HOB Operators, HOB Manufacturers and mass media related to Output 3, 5	29	2011/9/21	Output 3, 5	—
Field Training on Detailed Energy Conservation Diagnosis (3rd)	C/P and C/P-WG related to Output 4	1	2011/9/22, 9/23 and 9/29 (3 days)	Output 4	—
Explanation Meeting on Boiler Registration System (2nd)	C/P, C/P-WG and School Boiler Staff etc. related to Output 3	9	2011/9/29	Output 3	—
Lecture for Boiler Men (1st) (2011 to 2012 Winter Season)	Boiler Men	33	2011/9/29	Output 3	—
Explanation Meeting on Boiler Registration System (3rd)	C/P, C/P-WG, and Staff of Hospital, Sanatorium and Police Station etc. related to Output 3	30	2011/10/4	Output 3	—
Lecture for Boiler Men (2nd) (2011 to 2012 Winter Season)(Eastern District)	Boiler Men	46	2011/10/7	Output 3	—
Lecture for Boiler Men (3rd) (2011 to 2012 Winter Season)(Western District)	Boiler Men	45	2011/10/7	Output 3	—
Explanation Meeting on Boiler Registration System (4th)	C/P, C/P-WG and the Other Entrepreneurs related to Output 4	10	2011/10/11	Output 3	—
Training Course on Air Pollution Administration in Japan (2nd Year)	C/P and C/P-WG related to Output 4, 5	6	2011/10/16 to 10/29 (14 days)	Output 4, 5	—
Training on Wet Analysis Method	C/P and C/P-WG related to Output 2	4	2011/10/19 to 21 (3 days)	Output 2	—
Workshop on Energy Conservation Diagnosis	C/P and C/P-WG related to Output 4	2	2011/10/21	Output 4	⑤
Field Training on Stack Gas Measurement (2011 to 2012 Winter Season)	C/P and C/P-WG related to Output 2	9	2011/11/14 to 2012/2/17 (40 days)	Output 2	—
Follow-up Seminar for JICA Regional	C/P, C/P-WG and staff related to	(53)	2012/3/6	Output 1	—

Training Course "Control of Pollution by Vehicles in Urban Area" (Presentation at the Seminar)	Mobile Emission Sources				
Good and Bad Practice Seminar for HOB (1st)	C/P, C/P-WG, HOB Operators and HOB Manufacturers related Output 4	18	2012/4/5	Output 4	⑥
Dissemination Seminar on Project Activities (1st)	Ulaanbaatar City Citizen	More than 200 (Number of News Letters delivered)	2012/6/13	Output 5	—
Symposium on HOB Stack Gas Measurement and Air Pollution Simulation	C/P, C/P-WG and University etc. related to Output 1, 2	21	2012/6/13	Output 1, 2	—
Training on Pollutant Emission Inventory and Simulation	C/P and C/P-WG related to Output 1	9	2012/9/14, 9/17, 9/25 and 11/6 (4 days)	Output 1	—
Workshop on Operation of Equipment for Energy Conservation Diagnosis	C/P and C/P-WG related to Output 4	2	2012/9/27	Output 4	—
Dissemination Seminar on Project Activities (2nd)	Ulaanbaatar City Citizen	More than 350 (Number of News Letters delivered)	2012/9/28	Output 5	—
Field Training on Detailed Energy Conservation Diagnosis (4th)	C/P and C/P-WG related to Output 4	1	2012/10/12, 10/16, 10/17 (3 days)	Output 4	—
Lecture for Boiler Men (1st) (2012 to 2013 Winter Season)	Heating Stoves Utilization Department	12	2012/10/12	Output 3	—
Good and Bad Practice Seminar for HOB (2nd)	C/P, C/P-WG, HOB Operators and HOB Manufacturers related Output 4	13	2012/10/19	Output 4	—
Training on Boiler Registration and Management Database	C/P related to Output 3	2	2012/10/23	Output 3	—
Lecture for Boiler Men (2nd) (2012 to 2013 Winter Season)	Boiler Men	—	2012/11/15	Output 3	—
Lecture for Boiler Men (3rd) (2012 to 2013 Winter Season)	Boiler Men	—	2012/11/16	Output 3	—
Training Course on Air Pollution Administration in Japan (3rd Year)	C/P and C/P-WG related to Output 4, 5	6	2012/12/9 to 12/22 (14 days)	Output 4, 5	—

C/P: Counterpart, C/P-WG: Counterpart Working Group