

MINUTES OF MEETING OF
THE FOURTH JOINT COORDINATING COMMITTEE MEETING
ON JAPANESE TECHNICAL COOPERATION FOR
CAPACITY DEVELOPMENT PROJECT FOR AIR POLLUTION CONTROL IN
ULAANBAATAR CITY PHASE 3 in MONGOLIA

The Japan International Cooperation Agency (hereinafter referred to as "JICA") Supervisory Team for "Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3 in Mongolia (hereinafter referred to as "the Project")", JICA Mongolia Office, and JICA Expert Team (hereinafter referred to as "JET") had a series of online video meetings with Department of Against Air Pollution of Capital City (hereinafter referred to as "DAAP"), Ministry of Environment and Tourism (hereinafter referred to as "MET") and Joint Coordinating Committee (hereinafter referred to as "JCC") members from 12th January to 28th January 2021 to discuss the Progress Report 2, Monitoring Sheet No. 4, and held the third Counterpart Working Group (hereinafter referred to as "C/P-WG") meeting on 21st January and the fourth JCC meeting of the Project chaired by Mr. Tumurtumuu ZUNDUI on 28th January 2021. Participants list of the fourth JCC meeting is shown in Annex I.

Japanese side and the Mongolian authorities had a series of discussions. As a result of discussions, both sides agreed on matters referred to the document attached hereto.

The parties acknowledge and agree that this Minutes of Meetings may be executed by electronic signature, which is considered as an original signature for all purposes and has the same force and effect as an original signature. "Electronic signature" includes faxed versions of an original signature or electronically scanned and transmitted versions (e.g., via pdf) of an original signature.

Tokyo and Ulaanbaatar, 22nd February 2021

Mr. Taizo YAMADA
Leader, JICA Supervisory Team,
Japan International Cooperation Agency,
Japan,

田 畑 亨

Mr. Toru TABATA
Leader, JICA Expert Team, Japan

Mr. Tumurtumuu ZUNDUI
Project Leader of Capital City in
Charge of Air and Environmental
Pollution, Mongolia

Mr. Batmunkh DASHDEMBEREL
Director General
Environment and Natural Resources
Management Department, Ministry of
Environment and Tourism, Mongolia

Mr. Batkhuy IDESH
Director General
Development Financing
Department
Ministry of Finance, Mongolia

ATTACHED DOCUMENT

I. The Progress Report 2 and the Monitoring Sheet Vol. 4

JET presented the progress of the Project, future activity plan, and issues that the Project is facing since its beginning. After active discussions, the JCC approved the Progress Report 2 and the Monitoring Sheet No. 4.

II. Extension of the Project Duration

The Japanese side and the Mongolian side agreed that the Project duration should be changed from November 2018 to April 2023 (4 and half years) to November 2018 to July 2024 (5 years and 9 months).

III. Record of Discussion (hereinafter referred to as "R/D") and Amendment

The Japanese side and the Mongolian side agreed to conduct necessary revision of R/D to extend the project duration later. Based on the agreement on M/M of this JCC, JICA Headquarters and JICA Mongolia Office will start the procedure of RD revision. Draft of R/D and Amendment is attached as Annex IV.

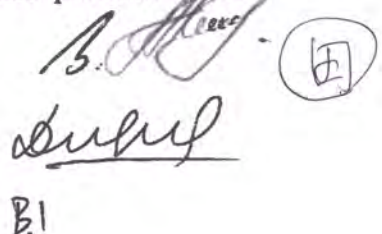
Revision of the Project Design Matrix (IV to VI)

IV. Revision of the Project Design Matrix (Objectively Verifiable Indicators, Means of Verification, Activities)

Regarding Output 6, the Air Pollution Against Fund has been abolished and revenue from the air pollution charge has been decided to be consolidated into the Environment and Climate Fund according to the amended law and the revision of the Air Law, but it is not yet functioning. The budget is spent by the related ministries to implement environmental pollution control measures, according to the implementation plan (action plan) which was approved by the board members of the National Committee for Environment Pollution Reduction (hereinafter referred to as "NCEPR"), including Vice Ministers of the related ministries, the Mayor of Ulaanbaatar City, and the Project Leader. Therefore, the Japanese side proposed to revise the description in the Project Design Matrix (hereinafter referred to as "PDM") from "Air Pollution Against Fund" to "sections of the relevant agencies in charge of allocating funds for air pollution control", and both sides agreed on the revision of the PDM. Such sections in charge of allocating funds for air pollution control, as which the secretariat of NCEPR is expected to be qualified, will be identified later, discussing with the Mongolian side. Annex II shows the changes to PDM.

1. Indicator 6-2

"6-2. More than 3 pollution control measures and technologies are funded by Air Pollution Against Fund by utilizing technical appraisal guideline provided by the

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Project.”

to be replaced by;

“6-2. More than 3 air pollution control measures and technologies are funded by the sections of the relevant agencies in charge of allocating funds for air pollution control by utilizing technical appraisal guideline provided by the Project.”

2. Means of Verification for Indicator 6-2

“Air Pollution Against Fund Operation reports”

to be replaced by;

“Minutes of meeting of NCEPR”

3. Activities

(1) Activity 4-5

“4-5 NCEPR utilizes the Outputs of the Projects and pilot projects implementation and assessment for operation of Anti-air Pollution Fund.”

to be replaced by;

“4-5 NCEPR, or the sections of the relevant agencies in charge of allocating funds for air pollution control in the Mongolian government such as the Environment and Climate Fund utilizes the Outputs of the Projects and pilot projects implementation and assessment.”

(2) Activity 6-5

“6-5 JICA Experts provide training on air pollution control measures for Anti-air Pollution Fund staff.”

to be replaced by;

“6-5 JICA Experts provide training on air pollution control measures and technical appraisal guidelines for staff of the sections of the relevant agencies in charge of allocating funds for air pollution control.”

(3) Activity 6-6

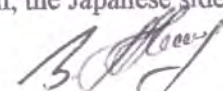
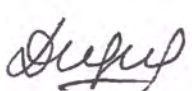
“6-6 Fund staff with JICA Experts improve relevant operations with funding for air pollution control measures, if necessary.”

to be replaced by;

“6-6 Staff of the sections of the relevant agencies in charge of allocating funds for air pollution control with JICA Experts improve relevant operations with allocating funds for air pollution control measures, if necessary.”

V. Proposal for additional Important Assumptions

Since the restriction on travel to Mongolia due to COVID-19 caused the significant delay of implementation of the project activities from its original plan, the Japanese side



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proposed the addition of Important Assumption 2 to PDM. Important Assumption 2 is: the COVID-19 pandemic situation will be improved and JICA will be able to send JICA Experts members to Mongolia toward April 2021 until the end of the Project. The Mongolian side approved it.

VI. Additional Activities

The on-board vehicle emission measurement system provided to National Agency for Meteorology and Environment Monitoring (hereinafter referred to as "NAMEM") in the Project phase 2 is no longer in use due to the absence of the person in charge. In 2019, the Ministry of Road and Transport Development (hereinafter referred to as "MRTD") requested NAMEM to transfer the system to the National Road Transport Center (hereinafter referred to as "NRTC"), which is an agency affiliated with MRTD, and the system was transferred to NRTC. In order to utilize the provided system and to conduct measurement for the pilot project, it became necessary to train NRTC staff.

The Japanese side proposed the following additional activity, and the Mongolian side agreed to add the Activity 1-3-3.

"Activity 1-3-3 JICA Experts conduct training to NRTC, in addition to DAAP, on vehicle emission measurement using on-board emission measurement system, and DAAP and NRTC implement vehicle emission measurement using on-board emission measurement system."

VII. Request from the Japanese side on the issues on the future project activities

1. Expansion of JCC member

The Japanese side and the Mongolian side agreed that "Traffic Control Center of the Ulaanbaatar City (hereinafter referred to as "TCC") is to join the JCC member.

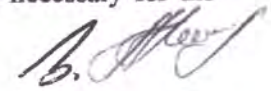
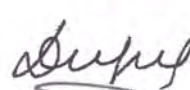
2. Expansion of C/P-WG

The Japanese side and the Mongolian side agreed that "Tavan Tolgoi Tulsh LLC" (hereinafter referred to as "TTT") is to join the CP-WG member after February 2021, through the Ministry of Energy (hereinafter referred to as "ME").

3. Providing samples of improved fuels from TTT

The samples of the improved fuels from TTT have not been provided in spite of the request from DAAP. Therefore, periodic combustion tests of the improved fuel are impossible, and JET cannot assess the status of the fuel produced by TTT. The Japanese side and the Mongolian side agreed that ME will provide the samples of the improved fuels to DAAP through TTT after February 2021 periodically.

4. Request for securing human resources and succession of duties necessary for the



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project

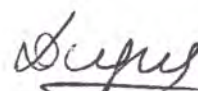
(1) Measurement of vehicle emission by the on-board emission measurement system
JET will train DAAP and NRTC staff based on the agreement in the third JCC on 5th December 2019. Regarding to this agreement, the Japanese side requested DAAP to recognize the importance of the succession of skills for emission gas measurement from the predecessors to the successors, and DAAP and NRTC to allocate at least two staffs in charge of the emission gas measurement of vehicles by April 2021. DAAP agreed on them.

(2) Japanese side requested DAAP that predecessors should transfer their skills of vehicle emission gas measurement using on-board emission measurement system to the successors when the person in charge is replaced, and DAAP agreed to it.

VIII. Requests regarding the issues and the obstacles for the pilot projects to expand to full-scale implementation by the Mongolian side

The small-scale pilot projects aim to verify the effectiveness of air pollution control measures, and the Japanese side requested the following points, which are necessary for the Mongolian side to implement full-scale project from the perspective of medium- and long-term air pollution control.

1. JET will propose technically improved fuels in the pilot project. JET indicated that the Mongolian side should clarify the roadmap to expand it to the full-scale project. JET requested that the ME should organize “the Committee for Reviewing Improved Fuel (tentative name)” by March 2021 including selecting members, where results of combustion tests in the first pilot project, a report of the pilot project, and the cost effectiveness will be discussed. The Project Leader agreed and responded that a working group would be established with the DAAP Director as the Chairman of the working group. The Mongolian side and JET agreed that the working group would be established by April 2021.
2. In the Implementation Plan of the National Program on Reducing Air and Environment Pollution, it is described as “3.3.3 Installation of Diesel Particulate Filter (hereinafter referred to as “DPF”), its regeneration system and constant service on diesel public buses”. However, this plan has not been implemented yet. JET will support to prepare the technical specification for the tender, and requested secretariat of NCEPR and MRTD to secure the budget and to prepare for the tendering (making specification) for DPF installation to public buses within 2021. Secretary General of NCEPR responded that the secretariat of NCEPR would fully cooperate in the installation of DPFs on diesel public buses.



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3. There is no legal basis to obligate the installation of DPFs on diesel vehicles in Mongolia. JET requested that the MRTD should establish the legal system by April 2023. The Secretary General of NCEPR responded that it is important to require all diesel vehicles including heavy-duty trucks, as well as public buses, to install DPFs in the future, and Secretariat of NCEPR would fully cooperate with installation of DPFs. JET will confirm the intention of MRTD regarding this request afterward.
4. The legal system such as regulations, penalties, elaboration of maintenance orders and ordinances to implement emission control using Remote Sensing Device (hereinafter referred to as "RSD") has not been established. JET requested that MRTD and the Public Transportation Service Department of the Capital City (hereinafter referred to as "PTSD") should elaborate the legal system by April 2023. JET will confirm the intention of MRTD and PTSD regarding this request afterward.
5. MRTD and the PTSD have not secured the budget to purchase at least one RSD. JET requested that MRTD and PTSD should prepare the budget to purchase at least one RSD by April 2023, in order to start RSD measurement after 2023. JET will confirm the intention of MRTD and PTSD regarding this request afterward.
6. JET requested the following issues regarding the expansion of the pilot projects to the full-scale implementation by the Mongolian side including the traffic signal control, the promotion of eco-driving, and distribution of low-sulfur fuel and low emission vehicles.

(1) Traffic Signal Control

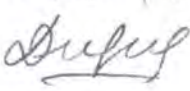
The pilot project of traffic signal control will be completed by April 2023. JET requested that TCC should secure the budget and establish the operation system by April 2022, in order to start the traffic signal control for whole Ulaanbaatar city. JET will confirm the intention of TCC regarding this request afterward.

(2) Promotion of Eco-driving

The pilot project of eco-driving will be completed by April 2023. JET requested that MRTD and DAAP should develop legal system to oblige the public bus operators to install the equipment for driving management, and to purchase the equipment. JET will confirm the intention of MRTD and DAAP regarding this request afterward.

(3) Expansion of sales of low-sulfur fuel and low emission vehicles

JET requested that MRTD and Ministry of Mineral and Heavy Industries (hereinafter referred to as "MMHI") should develop a legal system to accommodate the use of low-sulfur fuel, importation and sales of low emission vehicles, in order to start full



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scale project to expand low-sulfur fuel and low emission vehicle. MMHI responded that MMHI started legislation to expand usage of Euro 5.

IX. Project Director and Project Manager

The Japanese side and Mongolian side agreed that Ms. Tsolmon, a Head of Policy Implementation Division and Deputy Director in DAAP, was assigned as acting Project Director, and a Head of the Air Quality Management Division in DAAP was assigned as acting Project Manager for the time being.

X. Coordination Rule between the Project and the relevant projects supported by other development partners such as the World Bank, the Asian Development Bank (hereinafter referred to as "ADB"), United Nations International Children's Emergency Fund (hereinafter referred to as "UNICEF") and Swiss Agency for Development Cooperation (hereinafter referred to as "SDC")

As stated in the agreement of the first JCC on 12th December 2018, the Japanese side and Mongolian side confirmed that the project director will be the focal point for coordination and collaboration between this project and related projects supported by the other development partners such as ADB, UNICEF, and SDC. Annex V shows the "Coordination Rule between the Project and the relevant projects supported by other development partners such as ADB, UNICEF and SDC". The same rule is applied to Ulaanbaatar Clean Air Project (hereinafter referred to as "UBCAP") supported by the World Bank.

XI. Other Issues

1. The Project Leader requested the Japanese side to explain details of the pilot project of improved fuel. The Japanese side responded that JET would explain it to the Project Leader later.
2. The Secretary General of NCEPR requested the following points to the Japanese side;
 - (1) The Secretary General of NCEPR requested that the Inspection Agency of Capital City and the Ecology Police Department should join to the capacity development of RSD and vehicle emission measurement using on-board emission measurement system. The Japanese side responded that Japanese side would answer in next JCC, after considering the needs and the mandates of those agencies.
 - (2) Secretariat of NCEPR regards the installation of filters to Ger stove chimneys as important for pollution control in short term in Ger area. Although the Mongolian side had already started the activity, it did not work well because Mongolian side failed to set up the filter correctly. Therefore, the secretary general of NCEPR

requested the Japanese side to add an activity regarding filter installation to Ger chimney in the Project. The Japanese side responded that JET would assess the filter technology in question after JET could resume the travel to Mongolia. The Japanese side also mentioned that fundamental concept of JICA's measure for pollution control in Ger area are provision of improved coal based fuel usage in short term, and fuel shift from coal to gaseous or liquid fuels in long term.

3. Mr. Batbayar (NAMEM) mentioned that Sulfur reduction was becoming an important issue in Ulaanbaatar city these days, and requested to provide any report about analysis on air pollution structure to NCEPR if the Japanese side had any result of the analysis. JET responded that the analysis on air pollution structure of wintertime had done in the Phase 2 of the Project, and the activity is also included in the Phase 3 activity plan. In addition, it was mentioned that the analysis on air pollution structure was ongoing in this Project through PM component analysis and updating the emission inventory.
4. Mr. Dawaabayr (MMHI) requested the Japanese side to evaluate the difference between Euro 5 fuel and Euro 2 fuel by emission gas measurement from vehicles, since recent high concentration of sulfur in Ulaanbaatar city may be caused by vehicle emission. JET responded that on-board measurement system could measure concentration of NOx and PM, but not SOx. SOx concentration can be estimated from fuel consumption of the vehicle and sulfur content in the fuel.
5. DAAP requested the Japanese side to support connecting data of the Dambadarjaa air quality monitoring station to air quality monitoring network, since this station had not been connected online, and DAAP could not solve the issue both technically and financially. The Japanese side responded that JET would consider what kind of technical support JET could offer.
6. Mr. Barkhasragchaa (Central Laboratory of Environment and Metrology) requested to repair the equipment for calibration "SG741 (Kimoto Electric)", which was provided in the Phase 2 of the Project. The Japanese side responded that JET need to confirm the condition of the equipment at first, so JET would check the equipment and decide how to handle this issue after JET could resume the travel to Mongolia.

XII. Other comments from the Mongolian side

1. Mr. Dawaabayr (MMHI) mentioned that MMHI is starting two measures to legislate the usage of Euro 5 fuel. The first measure is revision of the Special Tax Law to reduce the difference between the sales price of Euro 2 and that of Euro 5





by lower tax for Euro 5 fuel and higher tax for Euro 2 fuel. MMHI suppose that Euro 5 fuel will become popular when its price becomes almost the same as the current fuel. As the second measure, MMHI are proposing revision of the Air Law to related ministries in order to prohibit the usage of the fuel that doesn't meet with Euro 5 regulation in the Air Quality Improvement Areas.

JET responded that The Mongolian side's policies for fuel shift to Euro 5 would be very effective, and provision of low-sulfur fuel would lead to the Euro 5 vehicle introduction and domination, then the sulfur emission from vehicles will be reduced.

2. The Secretary General of NCEPR mentioned that;

The Secretary General of NCEPR appreciated installation of DPF and RSD in the pilot project of vehicles. NCEPR will cooperate with these pilot projects. NCEPR are also considering installation of gas fuel for domestic use in Ger area and they would like to discuss about it with the Japanese side.

XIII. Opening remarks by JCC chairperson, Mr. Tumurtumuu ZUNDUI

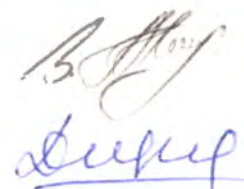
I greatly appreciate your participation today, and also appreciate JICA's cooperation until now. Mongolian side is making the most effort to reduce air pollution in Ulaanbaatar city. The progress and issues of the Project have been informed in advance, and the Mongolian side will cooperate to solve these issues. In this Project, which has been continuing for long time until Phase 3, I am aware that the most important issue is sustainability in securing staff. The Mongolian side will make efforts to secure staff as far as possible. I hope all relevant organizations will keep cooperation for smooth progress of this Project.

XIV. Conclusions by JCC chairperson, Mr. Tumurtumuu ZUNDUI

I believe that it is important for the personnel trained through the Project to keep working in their fields of responsibility. As for the impact of the turnover of trained personnel on the project activities, Mongolian side will make efforts to retain the trained personnel and to share their skills. Mongolian side is aware of all the issues facing the project and will keep discussing these issues with JET through Mr. Davaajargal, the acting Project Manager.

XV. Conclusions by leader of JICA Supervisory Team, Mr. Taizo YAMADA

JICA has been implementing this project based on an agreement between the Mongolian and Japanese governments since 2010. JICA has been cooperating with the Mongolian counterparts to develop their capacity to solve the air pollution in Ulaanbaatar city by their own hands based on scientific and technical evidences and data. The technical capacity of the C/Ps to solve various air pollution problems has improved remarkably



through Phase 1 and Phase 2 of this Project. However, from JICA's point of view, the remaining issue was that the technical capacities of these professional agencies might not be utilized for policy-making by the decision makers at higher position. In order to solve this remaining issue, this Project phase 3 aims to implement pilot projects for air pollution control, which will be developed into full-scale projects by the Mongolian side. By doing this process, I believe that the scientific and technical skills acquired by the professional agencies will help higher-level decision makers to make better decisions on policies and measures related to air pollution control and to implement more effective air pollution control measures. When this happens, I believe the blue sky will return to Ulaanbaatar city throughout the year.

END

Annex I Participants of Fourth Joint Coordination Committee

Annex II Presentation of Progress Report 2, Monitoring Sheet No. 4, Revised
Activity Plan and Important Issue

Annex III PDM (ver. 1.3)

Annex IV Draft of Record of Discussion and Amendment

Annex V Coordination Rules between the Project and the relevant projects
supported by development partners such as ADB, UNICEF and
SDC




Annex I Participants of Fourth Joint Coordination Committee

	Name	Organization	Position
1	Tumurtumuu Zundui	Ulaanbaatar City	Project Leader of Capital City in Charge of Air and Environmental Pollution
2	Batmunkh Dashdemberel	Ministry of Environment and Tourism, Environment and Natural Resources Management Department	Director General,
3	Altanzul	Secretariat of the National Committee for Air Pollution Reduction	Secretary- general
4	Ch. Chuluunbat	Ministry of Mining and Heavy Industry, Fuel Policy Department	Director General
5	D. Davaabayar	Ministry of Mining and Heavy Industry, Fuel Policy Department	Officer
6	A. Achbold	Ministry of Finance, Department of Grant Aid and Policy Development Fund Development Financing Department	Officer
7	J. Sereeter	Ministry of Road and Transport Development, Policy and Planning Department, Standard and Normative Division	Head of Division
8	D. Bolormaa	Ministry of Construction and Urban Development, division of Policy and Planning	Officer
9	J. Batbayar	National Agency for Meteorology and Environment Monitoring	Head of Division
10	B. Barkhasragchaa	Central Laboratory of Environment and Metrology	Senior officer
11	M. Munkhbayr	Mayor's office Development Policy Planning Department	Head of Division
12	Nyamdorj	Department of Public Transport service	Officer
13	Ugtakhbayar	Inspection Agency of the Capital City Division of Air Quality Control	Head of Division
14	S. Enkhtur	Traffic Planning, Coordination and Engineering Department of Capital City	Head of Division
15	Baldandorj	Governor's office Development Strategic Policy and Planning Department	Officer
16	T. Tsolmon	Department of Against Air Pollution of the Capital City	Acting Head of DAAP
17	G. Davaajargal	Department of Against Air Pollution of the Capital City, Department of Air Quality Management	Head of Department
18	G. Amartuvshin	Thermal Power Plan-3, Technical policy Division	Head of division
19	D. Lhagvadorj	Thermal Power Plan-4, Technical policy Division	Head of division
20	Taizo YAMADA	JICA Headquarter JICA Supervisory Team	Senior Advisor (Environment)
21	Hideaki MATSUOKA	JICA Global Environment Department Environmental Management Group Environmental Management Team 1 JICA Supervisory Team	Director
22	Itaru CHIBA	JICA Global Environment Department Environmental Management Group Environmental Management Team 1	Deputy Director

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		JICA Supervisory Team	
23	Eriko Tamura	JICA Mongolia Office	Chief Representative
24	Makiko INAMORI	JICA Mongolia Office	Project Formulation Advisor
25	Ch. MUNKHMANLAI	JICA Mongolia Office	National Staff
26	Toru TABATA	JICA Expert Team	Chief Advisor
27	Natsuji SAWAKI	JICA Expert Team	Sub Leader
28	Ei Edo	JICA Expert Team	Chief Sub Group Leader
29	Hajime Endo	JICA Expert Team	Clean Coal Technology / Pilot Project for Improved Fuel 1
30	Atsushi SATO	JICA Expert Team	Group Leader for Automobile
31	Shinya NAKATA	JICA Expert Team	Air Quality Simulation Model / Air Pollution Control Measures Evaluation / Emission Inventory
32	P. Ongonsar	ADB	Consultant
33	B. Mungunkhishig	UNICEF	Officer
34	Kh. Galimbek	Tavan Tolgoi Tulsh LLC	Expert
35	Tomoyuki Matsuhashi	Embassy of Japan in Mongolia	Second Secretary
36	Misato AKATSUKA	JICA East Asia Division	Officer

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Annex II Presentation of Progress Report 2, Monitoring Sheet No. 4, Revised Activity Plan and Important Issue

Монгол улс Улаанбаатар хотын Агаарын
бөхирдлийн хяналтын чадавхыг бэхжүүлэх
тосол (3 дугаар үе шат)

ХЗХ-ны 4 дүгээр хуралдаан

2021 оны 1 сар
ЖАЙКА мэргэжилтний байр

1. Төслийн явцын тайлан
/Дугаар 2/-ын сөрөнхий агуулга

ХЗХ-ны 4-р хурлын зорилго (1)

1. Төслийн хяналт талдан /Дугаар-2/ (2019.11-2020.10) бэлгэх
2. Гүйцэтгэлийн тайлан /Дугаар-4-р/ бэлгэх.

1.1 Эрхэм зорилго, төслийн зорилго

Знаме
всеполно

Ўр дун

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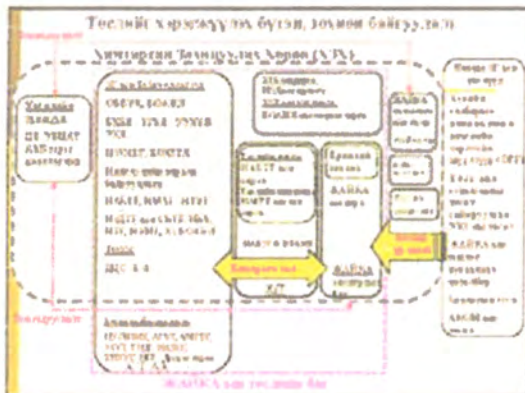
ХЗХ-ны 4-р хурлын зорилго (2)

**Төслийн үр дүнд бий болгох агаар
орчны хяналтын цикл**



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1.3. Үр дүнгийн хэрэгжилтийн явц

- КОМБЕТ-19 цар таслан төхөөтэй байсан 2020 оны 3 сарын 1 хошой Япон мөргөлдөөнтэй Монголд ирж явчлах боломжтой болж, 2020 оны 2 сарын дундны өдөр үйлдэж харьяаттай болсон.
- 2020 оны 1 сарын хошой Япон мөргөлдөөнтэй ХТ-ий цахим хуудрууд харьяаттай 2-2, үйлдэж харьяаттай байсан.
- КОМБЕТ-19 цар таслан төхөөтэй байсан 2021 оны 4 сарын таслан дуусаж хүчингүй болж Монголд явчлах боломжтой байхад бүх үйлдэж харьяаттай өөрчлөлт орж байсан.

1.2. Хамтарсан Зохицуулах Хорооны дурд (ХЗХ),
нээтийн сессинар

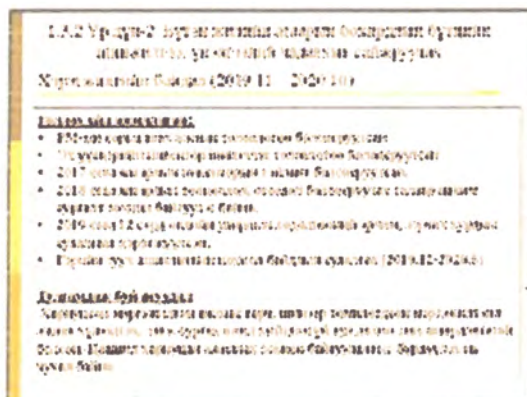
- 2019 оны 12 сарын 3-нд одор ХТ-АН-ийн 2-р хуралдаан, 2019 оны 12 сарын 5-нд одор НХН-ийн 3-р хуралдааныг тус бүр зохион байгуулсан
- НХН-ийн 3-р хуралдаанаар
 1. Үр дүнгийн нөлгөөр үзүүлэгчүүдийг баталж, ТТМ-ыг нийлэгтсээн. (Хувилбар 1.2)
 2. Ахуйн хэрэгцээний сайжруулсан нямдал тулгынний цагвар төслүүн үр дүн баталгаажуулах ажлыг 1 жил эр хойшуулсан

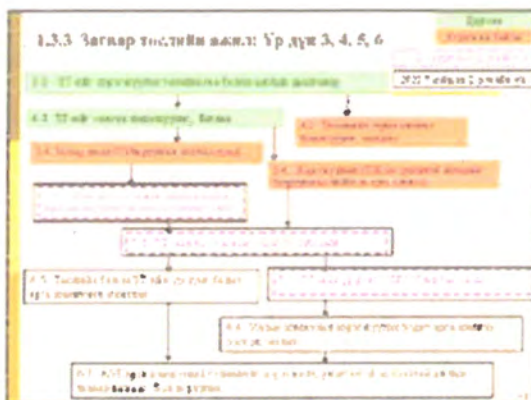


1.2. Хүхтэрчин Зохицуулах Хорооны хурал
(ХХХ), иргэдийн сөмнөөр

- [illegible]





[illegible]

Цаандын төлөвлөгөө

3.1 Үйл ажиллагааны төлөвлөгөө (1)

[illegible][illegible]

ХЗХ-ны 4-р хурлын зорилго (1)

5. Ціацетилін утворюється в процесі метаболізму (80% в організмі).

3.1 Үйл ажиллагааны төлөвлөгөө (2)

□ Цагын хэлбэрээр харилцах, хэрэгжүүлэх боломжийн:
үйлчилгээний 2-д. Агаар орчны тархалтын агаарчлалт
 үрслэлтүүр модель шинэласэн агаарын бохирдлын бүтэц,
 өргөтгөлийн үйлдвэр.

Үйлдвэрлэлийн 5.3 Сайн дурын шатонд түншийг үйлдвэрлэлийн технологийг сайжруулахад товлдох

Ғылым және инновациялар министрлігі

Бусад үйл ажиллагааг ээлжлэн хариуцдагдсаны дараа үргэлжлүүлэн.

ХЗХ-ны 4-р хурлын зорилго (2)

3.2. Удвоение 2-1 FM хитовый набор ритмов и мелодик

1.1 РМ ҮА үгсээрхөн векторын дүн хэмжээг r гэж тэмдэглэе.

1. Духовно-управляющая форма дух, отсюда: управление и управление духом, отсюда: управление и управление духом.

2. Төлөөний дэгт бүтэцтэйгээр бүтэцтэй, өөрөөр хэлбэл төрөлөөнийг төрөлөөнийг

1.2 Арифметика вычисления

Төсвийн 1-р үеийн төлөвлөгөө 1-ш Ү-р үеийн төлөвлөгөөтэй FM-сориодотч төхөөрөмсийн мөнгөтэй тэнцүүлсэн. Эхний 3-р үеийн төлөвлөгөөт суурилж, 2021 оны 4 сарын FM-сориодотч төхөөрөмсийн төлөвлөгөө, 2022 оны 4 сар дунд дүнгийн, Нэгдүгээр төмөр замын үр чадал өсөлтүүдтэй нийцжээ. 2022 оны 4 сарын эхний төлөвлөгөө байна.

[illegible]

• $\mathcal{A} \subseteq \mathcal{B}$ if $\mathcal{A} \cap \mathcal{B} = \mathcal{A}$ and $\mathcal{A} \cup \mathcal{B} = \mathcal{B}$. If $\mathcal{A} \subseteq \mathcal{B}$ and $\mathcal{B} \subseteq \mathcal{A}$, then $\mathcal{A} = \mathcal{B}$. If $\mathcal{A} \subseteq \mathcal{B}$ and $\mathcal{B} \subseteq \mathcal{A}$, then $\mathcal{A} = \mathcal{B}$.

[illegible][illegible]

Анхаарал тавьсангү баярлалаа

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80																				



Монгол улс Уливинбатыр хотын газрын
бохирдлын хөгжлийн чадавхийг бэхжүүлэх
төсөл (3 дугаар үе шат)

Тулгарч буй асуудал, ТТМ, үр дүнгийн
шалгуур үзүүлэлтийг өөрчлөх тухай

2021 оны 1 сар

4. Төсөл хэрэгжих хугацааг сунгах санал

Төсөл 2018 оны 11 сараас эхлэн
Дуусах хугацаа 2022 оны 4 с. дунд (нийт 4.5
жилаа байсан) 2024 оны 7 сар хүртэл бөглөж, 9
сард сунгах санал гаргаж байна.

ХЗХ-ны 4-р хурлын зорилго (1)

4. Төсөл хэрэгжих хугацааг өөрчлөх санал
5. Төслийн баримт бичиг (Record of Discussion) -ийг шинэчлэх шаардлага
6. Тулгарч буй асуудал, ХЗХ-ны хурлаар хэлэлцэх туйл
 - 6.1 Асуудал, холбогдох хүсэлт
 - 6.2 Загвар төслийг бодит арга хэмжээ болгох, холбогдох асуудал, шийдвэрлэх хүсэлт

5. Төслийн баримт бичиг (RD)-ийг шинэчлэх шаардлага

ХЗХ-ны хурлаар төслийн хугацааг сунгасан тогтоолол Төслийн баримт бичиг (Record of Discussion)-т өөрчлөлт оруулах шаардлагатай. Төслийн баримт бичигт оруулах өөрчлөлтийн тухай энэ удаатгийн ХЗХ-ны хурлын протоколд тусгаар тогтнолоонд тулгуурлаж ЖАЙКА-ын төлөөлөгчийн газар харуулан Япон босон Монгол тал төслийн баримт бичигт гарзан үсэг зурж баталгаажуулна.

ХЗХ-ны 4-р хурлын зорилго (2)

- 6.3 Автоматштай холбоотой газар төслийн баримт арга хэмжээ болгох, шийдвэрлэх асуудал
- 7 Япон, монгол тал харилцан томилох асуудал
 - 7.1 ТТМ-ын үр дүнгийн шалгуур үзүүлэлт, үйл амьдраланд өөрчлөлт оруулах санал
 - 7.2 Төсөлд нөлөөлөх гадаад хүчин туйлст нэмэлт оруулах санал
 - 7.3 ТТМ-ын үйл амьдралд нэмэлт санал
8. Төслийн дарга, төслийн менежерийг томилох тухай санал
9. Холбоотой байгууллагуудтай хамтран, уялдаатай ажиллах талар

6. Тулгарч буй асуудал, хэлэлцэх туйл 6.1 Асуудал, холбогдох хүсэлт (1)

Асуудал	Хүсэлт
ТТТ хөгжлийн сайжруулсан шалгуур түлшний үйлдвэрлэлийн талар төмөр замын мэдээллийн систем шинэчлэх	ХЗХ-ны хурлаар шийдвэр гаргаж, ХЗХ-аар дэмжүүлэн ТТТ хөгжлийн төслийн ХТ-АХ-т нэмж оруулах боломжийг дүрдүүлж 2021 оны 2 сараас хойш
ТТТ сайжруулсан түлшний шалгуур туршилт тогтоол хийгдэхгүй байгаа тул түлшний нөөцтэй байдал бэлтэй шалгах боломжгүй.	2021 оны 2 сараас хойш ХЗХ нь ТТТ хөгжлийн сайжруулсан шалгуур түлшний дээжээр НАБТТ-ийн тогтоол хангах

(Handwritten signature)



6.1 Асуудал, холбогдох хүсэлт(2)

Агуулга	Хүснэ
Түрэмжлөхтөй эсвэл дутаа, зогсоо, алтны сайжруулах зориуд 15ийг зориулж ЗХУТ нь голчлон үүргийн эрэлцэх шаардлагатай.	ЗХУТ-ийг ХХХ-ийг гишүүнээр нэмж оруулан, цаашин ХХХ-ыг хурат хэлэлцүүртэйг эрэлцэх.

6.2. Загвар төслөөс бадит арга хэмжээ болгох
Асуудал, холбогдох хүсэлт(1)

Асуудал	Нүсхэ
Затвар төслөрө төсвийн албан хаагчид дэвшилтийг хийхээрүүлсэн хүснэгт түлээнийг туршиж синал болгохыг Монгол тала хүлээн авч, богиносгор хэрэгжүүлэх боломжтой эсэх	ЭХЯ нь затвар төслөд ашигласнаас түлээнийг ашигласнаас үүсрэг утасны хэвдэ хэрэглэлийн түлэ, төсвийн үр дүнгүйг тайллан гаргал да үр нийгмийг хэрэглэж хэрэглэх ажилын хэргийг байгуулж, гүн үүднийг сөнөөх (2021 оны 8 сардас өмнө)

6.1 Асуудал, холбогдох хүсэлт(3)

Асуулцаж	Хариулт
НАБТ-ын хэрлэгчөөр тух үүсвэр хариуцажээ мэрэгшвидлээр АСХУХ-ийг шинэчилсэн хайгуул утаснаа хэрэглэдэг хэрлэгчээр чиданхайр зэмшүүрсэн бэлдвэр өөр ажлын шилжилт, шүүсвэр тооцоллогоосон шийдвэрэнд таныг сурталч ажилч хийдэгдээгүй тул бие дааш хэргийнхтэй холбоо тооцоллогогүй бэлдвэр	НАБТ нь цаашдаг хариуцажээ мэрэгшвидлээр өөрчлөгдөх тохиолдлыг түүнээр хариуцаж дараахд нь хуулийг хуульчсагуулах, таныг сурталч бэлдвэр үзвэр бэлдвэр, хэрлүүрээ

6.2 Загвар төслөөс бодит арга хэмжээ бэлтгэх

Ազգային	Քաղաք
Միջոցների հատվածը «ՀՀ Կինոֆիլմի տնտեսական ակտիվի հաշվառման և վերականգնման կենտրոն» (ՀՀԿԿ) կողմից օգտագործվող ֆինանսական հաշվարկային տվյալները:	Վրաստանի Հանրապետության տնտեսական կապիտալի ծախսերի և եկամուտների հաշվարկային տվյալները:
ՀՀԿԿ-ի կողմից օգտագործվող ֆինանսական հաշվարկային տվյալները:	ՀՀԿԿ-ի կողմից օգտագործվող ֆինանսական հաշվարկային տվյալները:

† ၂၀၀၀-၀၈-၆ ရက်နေ့တွင် ကွယ်လွန်သည်။

6.1 Асуудал, холбогдох хүсэлт(4)

Агуулга	Хугаца
ХЭХ-ны 3-р хуралдаанаар 2019.12.05 мөнгөн тэмдэгт гаргасан хүсэлтэйг дауу НАБТТ, АТҮТ-д АХЖУХ-ийг шингэлсэн хяналт утасны хэрэгсэлийн төлөөлөгчид чадваргүй дэмжүүлэхээр болсон бодол хүрээт харьяа байгууллагуудын хариуцах мөргөжлөхөөдийг төлөөлөгчид байн	ХЭХ-ны хуралдаанаар тодорхойлогсон дагуу: - НАБТТ нь хариуцаан амилтгүй гэдгээр суулцаад өнгөцболоо мөсөрөх - 2021 оны 4 сар гэхэд АТҮТ НАБТТ нь хяналт утасны хэрэгсэл хэрэгцээ 2-оос дээш мөргөжлөхтэйг төлөөлөгчид амилуулах

6.2. Загвар төслөөс бодит арга хэмжээ болгох
Асуудал, холбогдох хүснэгт(3)

Агуулга	Хүснэгт
Монгол улсад хөдөлгүүртэй ТХ-д DPF суурилуулалт үүрэг биелсөн төтсөл, журам бэлтгэл, хяналтын гэрэлтэл бүтээгдсэн.	ЗТХЯ-наас хурь эрх зүйн эрчим нэмэгдэл бүтээгдсэн. (2023 оны 4 сар)

B.1

7.1 ТТМ үр дүнгийн шатнуур үзүүлэлт, үйл ажиллагааны агуулгыг өөрчлөх санал (5)

Үр дүн-6 шатнуур үзүүлэлт-2-ыг хянах бүтэцтэйгн нөөцлийг өөрчлөх

ТТМ Агуулгын 1.2	ТТМ д оруулах өөрчлөлтний санал
АБЖС-ийн талын	ОББҮХ-ийн хуралын туслах

7.1 ТТМ үр дүнгийн шатнуур үзүүлэлт, үйл ажиллагааны агуулгыг өөрчлөх санал (8)

ТТМ Агуулгын 1.2 ТТМ д оруулах өөрчлөлтний санал

Үйл ажиллагаа 6.6 ЖАЙКА мөргөжлөгч нь АБЖС-ийн талын басгалыг бууруулах арга хэмжээний төсвийн бөртөг бичиг бүрэлдэх процедурыг сайжруулах чиглэлээр шаардлагатай гэж үнэлэж дэмжлэг үзүүлэх	Үйл ажиллагаа 6.6 ЖАЙКА мөргөжлөгч нь агаарын бохирдлыг бууруулах арга хэмжээний санхүүжилтийн хүчингээг хэрэглэх талар хүчингээг хэрэглэх талар хүчингээг хэрэглэх талар хүчингээг хэрэглэх талар хүчингээг хэрэглэх талар хүчингээг хэрэглэх талар хүчингээг хэрэглэх талар хүчингээг хэрэглэх талар
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7.1 ТТМ үр дүнгийн шатнуур үзүүлэлт, үйл ажиллагааны агуулгыг өөрчлөх санал (6)

ТТМ Агуулгын 1.2 ТТМ д оруулах өөрчлөлтний санал

Үйл ажиллагаа 4.5 ОББҮХ нь АБЖС-ийн хүчингээг хэрэглэх тус төсөв бөртөг талар төсвийн үр дүнгийн	Үйл ажиллагаа 4.5 ОББҮХ нь АБЖС-ийн хүчингээг хэрэглэх тус төсөв бөртөг талар төсвийн үр дүнгийн
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7.2 ТТМ-ын гадаад хүчин зүйлс нэмж оруулах санал

КОВИД-19 хамгийн хэрэгсэл уламжлалт ажиллагаа болохгүй, үйл ажиллагааны хэрэгсэлт хайлжидоор байна

ТТМ Агуулгын 1.2 ТТМ д оруулах өөрчлөлтний санал

1. ОББҮХ мөргөжлөгч хүчингээг хэрэглэх тус төсөв бөртөг талар төсвийн үр дүнгийн	1. ОББҮХ мөргөжлөгч хүчингээг хэрэглэх тус төсөв бөртөг талар төсвийн үр дүнгийн
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7.1 ТТМ үр дүнгийн шатнуур үзүүлэлт, үйл ажиллагааны агуулгыг өөрчлөх санал (7)

ТТМ Агуулгын 1.2 ТТМ д оруулах өөрчлөлтний санал

Үйл ажиллагаа 6.5 ЖАЙКА мөргөжлөгч нь АБЖС-ийн талын агаарын бохирдлыг бууруулах арга хэмжээний төсвийн бөртөг талар бөртөг талар	Үйл ажиллагаа 6.5 ЖАЙКА мөргөжлөгч нь агаарын бохирдлыг бууруулах арга хэмжээний санхүүжилтийн хүчингээг хэрэглэх талар хүчингээг хэрэглэх талар хүчингээг хэрэглэх талар хүчингээг хэрэглэх талар хүчингээг хэрэглэх талар хүчингээг хэрэглэх талар хүчингээг хэрэглэх талар
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7.3 ТТМ-д шинээр оруулах үйл ажиллагаа (1)

Төслийн 2-р үе шатанд ЦУОНН-т нийтүүлсэн АСХУХ-ийн хариуцсан мөргөжлөгч байхгүйн улмаас ашиглахгүй байсан тул 2019 онд ЗТХЯ-наас салбарын хэмжээнд байгууллагад АСХУХ-ийг шилжүүлэх хүсэлт гаргасны дагуу АТҮТ-д хүргэж өгсөн.
Тус төхөөрөмжид үр дүнтэй ашиглах, загвар төслийн хэмжээнд хийхэд АТҮТ-ийн боловсон хүчнийг сурих шаардлагатай байна.

Б.1

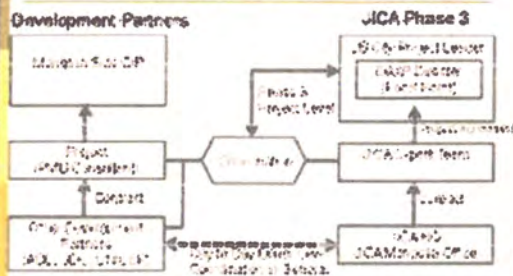


7.3 ТТМ-д шинээр оруулах үйл: ажиллагаа (2)

ТТМ Хувилбар 1.2	ТТМ д оруулах өөрчлөлтөөс саяа
Үйл ажиллагаа 1-3-3 Байгуул	Үйл ажиллагаа 1-3-3 ЖАНКА мэдээлсэн нь НАБТ- болон АТУТ-д АСХУХ ашигласан засварч эхлэвч, хэмжээний эргэлтээс өмж, НАБТ, АТУТ нь хөдөлгөөнийг хэмжээтэй хийв.

ЖАНКА байгууллага нь НАБТ-д хамтран ажилладаг төсөл
төрийн байгууллагад хамтран ажилладаг.

9 Хандлагач байгууллагатай хамтран уялдаатай ажиллах (2)



8. Төслийн дарга, төслийн менежерийг томилох тухай санал

НАБТ-ын дарга шинээр төвлөснөөс удаагүй
байгаа учраас төслийн даргаар НАБТ-ын БТХ-
нийн дарга, дэд дарга Цоюсанг, төслийн менежерээр
АЧХ-ны хэлтсийн даргатай тус бүр томилох тухай
санал болсон байна.

Алжаарал тавьсанг, баярлалаг

9 Хандлагач байгууллагатай хамтран уялдаатай ажиллах (1)

ХЗХ-ны мөрддугаар хуралдааны үеэр харицсан
тохиролцсоны дагуу тус төсөл нь ДБ-ны "Цөөр
агаар төсөл", бусад хандлагач байгууллагын
мөхбөддөх төсөлтэй хамтарч уялдаатай ажиллахад
НАБТ-ын дарга томилогч үүрэгтэй гүйцэтгэх
ажиллах.

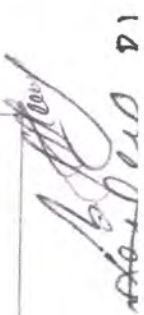
Project Design Matrix (PDM)

Ver.1.3

Dated: January 28, 2021

Project Title: Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3
Implementing Agency: Air Pollution Reduction Department (DAAP) of Ulaanbaatar (UB) City, Ministry of Environment and Tourism (MET) and Counterpart Working Group (C/P-WG)
Target Group: DAAP, MET, C/P-WG and Relevant Agencies
Duration of the Project: November 2018 – July 2024 (5 years and 9 months)
Project Site: UB City

Narrative Summary		Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Emission reduction at major emission sources is enhanced towards air quality improvement in Ulaanbaatar City	1. XX% of emissions from major pollution sources is reduced compared with the BAU baseline.		1. Comparison between BAU and updated inventory for target year (3 to 5 years after completion of the Project)	
Project Purpose Capacity for air pollution control in Ulaanbaatar City is strengthened, paying special attentions to implementation of effective pollution control measures and to the necessary coordinating mechanism of DAAP and the relevant agencies.	1. XX of pilot projects are adopted as full scale implementation by relevant authorities. 2. XX cases of lessons learned from the pilot projects are utilized by the decision makers. 3. Relevant laws, regulations and standards on air pollution control measures are implemented in UB City. (such as XX of newly established MNS standards, XX% of achievements of existing MNS emission standards)		1. The Project reports 2. Interview survey to the relevant agencies 3. Laws, regulations, MNS standards, and ordinances of UB City	
Outputs				
Output 1: Capabilities of emission monitoring for the major pollution sources and of air quality monitoring are strengthened.	1-1. During the Project duration, at least 50 % of inspections for boiler registration based on emission measurements (including standard and simplified methodologies) are implemented by DAAP and IACC. 1-2. The emission measurement reports are submitted to the Deputy Governor of UB City at least 3 times during the Project duration. 1-3. Emission monitoring for the major pollution sources and air quality monitoring information are shared regularly among the relevant agencies through coordination between DAAP and NAMEM. 1-4. The CEMS measurement is compared with the standard measurement once in a year. 1-5. Distribution of emission measurements from vehicles in UB City is prepared based on the study with RSD at least once a year.		1. Emission measurement reports by DAAP / IACC 2. The Project reports 3. Boiler registration database 4. Air quality monitoring monthly reports and annual reports 5. CEMS data	1. Legal and political framework for air quality management is maintained, which defines decision making mechanism such as NCEPR and professional agencies like DAAP and NAMEM. 2. The COVID-19 pandemic situation will be improved and JICA will be able to send JICA Experts to Mongolia toward April 2021 until the end of the Project
Output 2: Capabilities to analyze and evaluate pollution structure of PM, SO ₂ and NO _x throughout the year are strengthened.	2-1. The results of PM apportionment study are reported at least three times during the Project. 2-2. Pollution structures are assessed at least 3 times during the Project duration including emission inventory, simulation model, PM specification, receptor model, air quality monitoring and population exposure throughout the year.		1. The Project reports	
Output 3: Capabilities of technical evaluation and preparation of air pollution control measures for implementation are strengthened.	3-1. Drafts of emission measurement methods and quality standards of improved fuel for households in Ger area are submitted to MASM. 3-2. At least three of implementation plans of the pilot projects are prepared.		1. The Project reports	
Output 4: Decision making process for air pollution control is improved by utilizing the Professional agencies including DAAP, NAMEM and the relevant agencies.	4-1. Analysis of air pollution status, short-, medium- and long- term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned) are presented to decision makers at least 2 times. 4-2. Results of pilot project implementation and other Project results are utilized for the revision of NCEPR and for decision making on implementation/non-implementation of pollution control measures at least once.		1. The Project reports 2. Reports on NPREP	



Output 5: Air pollution control measures are enhanced for PM, SO₂ and NO_x emission reduction at major sources. Output 6: Legal framework, resource allocation and coordinating mechanism as a Platform for the Air Quality Management Cycle are strengthened for the Outputs 1 to 5.	5-1. At least three pilot projects selected by C/P-WG are implemented 5-2. The results of each pilot project (emission reduction, improvement of ambient air quality and population exposure for PM, SO₂ and NO_x) are presented to the relevant agencies. 6-1. At least three of drafts on laws and regulations, such as fuel regulations, MNS emission standards and ordinances of UB City, are submitted. 6-2. More than 3 air pollution control measures and technologies are funded by the sections of the relevant agencies in charge of allocating funds for air pollution control by utilizing technical appraisal guideline provided by the Project. 6-3. At least three agreements are made on demarcation of roles of the relevant agencies for air pollution control measures in the Project. 6-4. The operational guideline is distributed to relevant agencies.	1. The Project reports	1. Laws and regulations, fuel regulations, MNS emission standards and ordinances of UB City 2. Minutes of Meeting of NCEPR 3. Official documents including UB city Governor's orders 4. Operational guideline	1. There are no frequent leaves, transfers or resignations of C/P and C/P-WG members. 2. Necessary coordination among UB city, districts, khoroos and communities in Ger area is secured by Mongolian side for implementation of pilot projects.
Activities	Inputs	Outputs	Japanese side 1. JICA experts (necessary fields) (1) Chief Advisor (2) Air Pollution Control Planning and Policy for Stationary Sources (3) Ambient Air Quality Monitoring (4) Ambient Air Quality Analysis (5) PM10 and PM2.5 Sampling (6) PM10 and PM2.5 Apportionment Study (7) Emission Inventory (Stationary, Mobile and Others) (8) Air Quality Simulation Modeling / Air Pollution Control Measures Evaluation (9) Auto-mobile Emission Control 1 (Traffic Signal Control) (10) Auto-mobile Emission Control 2 (others) / Emission Measurement 2 (11) Clean Coal Technology for Air Pollution Control Measures (12) CEMS Data Analysis (13) Stationary Source Emission Control Measures (14) Air Quality Administration Mongolian side 1. C/P and C/P-WG (1) JCC Chairperson (2) JCC Vice-Chairperson (3) Project Director (4) Project Manager (5) Necessary C/P and C/P-WG staff according to the fields of JICA Experts 2. Facility (1) Provision of necessary office space in DAAP and MET (including internet access) (2) CLEM Laboratory (3) Storage Space for Equipment 3. Local cost (1) Counterpart expenses such as salary, allowance, travel cost and accommodation (2) Project administrative expenses	1. There are no frequent leaves, transfers or resignations of C/P and C/P-WG members. 2. Necessary coordination among UB city, districts, khoroos and communities in Ger area is secured by Mongolian side for implementation of pilot projects.

2-1 NAMEM and JICA Experts conduct PM apportionment study based on PM speciation throughout the year. 2-1-1 CLEM and JICA Experts elaborate PM sampling plan throughout the year, and implement PM samplings. 2-1-2 JICA Experts perform PM speciation analysis in Japan. 2-1-3 NAMEM and CLEM with JICA Experts learn PM speciation technologies (ion analysis, element analysis and carbon analysis). 2-1-4 NAMEM and CLEM with JICA Experts formulate equipment and laboratory plan for PM speciation. 2-1-5 DAAP and NAMEM with JICA Experts perform PM apportionment study based on receptor modeling. 2-2 DAAP and NAMEM with JICA Experts evaluate air pollution structure and health impact based on air quality simulation model and receptor model. 2-2-1 DAAP and NAMEM elaborate plans for updating emission inventory. 2-2-2 DAAP, TCC and PTSD implement studies for mobile sources including update of emission inventory, examination of traffic signal control, traffic volume and vehicle traveling speed. 2-2-3 DAAP and JICA Experts select the pilot areas and assess Ger stoves usage pattern (type and model of stoves, seasonal pattern of usage, insulation of Ger housing and coal consumption). 2-2-4 DAAP and NAMEM with JICA Experts implement studies for other emission sources as necessary. 2-2-5 DAAP and NAMEM with JICA Experts elaborate BAU (Business as usual) scenario for the future year based on TPPs future development plans, projection of number of vehicle, population, economic growth, emission regulation, fuel quality regulation and so on. 2-2-6 DAAP and NAMEM update emission inventory for the present year and the future year for the BAU scenario. 2-2-7 DAAP and NAMEM update the air quality simulation model for PM10, SO₂ and NO_x. 2-2-8 DAAP and NAMEM evaluate the air pollution structure of UB city. 2-2-9 DAAP and NAMEM evaluate indicative population exposure of PM10 based on population weighted concentration and so on. 3-1 DAAP and the relevant agencies elaborate a draft MNS on an emission measurement method of improved fuel and fuel quality, and propose it to MASM. 3-2 ME with JICA Experts elaborates safety standards on the household gas distribution. 3-3 DAAP and the relevant agencies elaborate implementation plans and terms of reference for pilot projects such as improved fuel, HOB, traffic signal control, eco-driving, RSD, smoke belching program based on portable emission device, DPF, low sulfur fuel and low emission vehicles. 4-1 DAAP and NAMEM submit to the decision makers the analysis of air pollution status, short-, medium- and long-term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned). 4-2 Relevant agencies with pilot projects elaborate technical guidelines and utilizes them. 4-3 The relevant agencies discuss and endorse the selection of pilot projects. 4-4 NCEPR and the relevant agencies approve large scale investments based on pilot projects implementation and assessment. 4-5 NCEPR, or the sections of the relevant agencies in charge of allocating funds for air pollution control in the Mongolian government such as the Environment and Climate Fund utilizes the Outputs of the Projects and pilot projects implementation and assessment. 5-1 DAAP with Health Department of Capital City and the relevant agencies implements public awareness and advisory activities for citizens including school students and parents. 5-2 MET and DAAP publish progress of the Project by newsletter, newspaper articles, web-site and other medias. 5-3 DAAP and JICA Experts provide technical guidance to manufacturers for improved fuel production. 5-4 The relevant agencies with JICA Experts implement pilot projects according to the implementation plan by Activity 3-3. 5-5 The relevant agencies with JICA Experts evaluate pilot projects results in terms of emission reduction, air quality improvement and exposure to citizens, and extract lessons learned. 5-6 The relevant agencies with JICA Experts report the pilot projects results to NCEPR. 5-7 TPP3 and TPP4 analyze CEMS data, and examine viable air pollution control measures. 5-8 TPP3 and TPP4 with JICA Experts elaborate emission reduction plans.	(16) Public Awareness and Public Relations 2. Training (1) Local seminars and workshops (2) Training course in Japan 3. Provision of necessary equipment 4. Local cost Necessary expenses for activity of JICA Experts	Pre-conditions 1. Appropriate number of qualified staff of C/P and C/P-WG is assigned. 2. Adequate amount of budget related with the Project
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(H)

6-1 The relevant agencies discuss and elaborate written agreements on demarcation of roles in air quality management related with each Output and Activity of the Project. 6-2 DAAP with JICA Experts submits technical documents to NCEPR for improved fuel standard, emission standard on stationary sources, mobile sources and other emission sources, and revision of ordinance. 6-3 NCEPR and the relevant agencies elaborate fuel standard and emission standard, and submit them to MASM. 6-4 Relevant ministries / relevant agencies of UB city elaborate laws, regulations and ordinances on air pollution control measures, and submit them to national parliament / city council. 6-5 JICA Experts provide training on air pollution control measures and technical appraisal guidelines for staff of the sections of the relevant agencies in charge of allocating funds for air pollution control. 6-6 Staff of the sections of the relevant agencies in charge of allocating funds for air pollution control with JICA Experts improve relevant operations with allocating funds for air pollution control measures, if necessary. 6-7 Mongolian side enhances donor coordination in air pollution control. 6-8 Relevant agencies of pilot projects with JICA Experts develop an operational guideline for elaboration, implementation and evaluation of air pollution control measures based on pilot projects implementation.	implementation is secured. 3. Necessary human resources mobilization related with pilot projects is secured by Mongolian side.
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AQMS: Air Quality Monitoring Station
 BAU: Business as Usual
 CEMS: Continuous Emission Monitoring System
 CFWH: Coal Fired Water Heater
 C/P: Counterpart
 C/P-WG: Counterpart Working Group
 DAAP: Department of Against Air Pollution of Capital City
 DPF: Diesel Particulate Filter
 FRM: Federal Reference Method
 HOB: Heat Only Boiler
 IACC: Inspection Agency of the Capital City
 MASM: Mongolian Agency for Standardization and Metrology
 MET: Ministry of Environment and Tourism
 MMHI: Ministry of Mining and Heavy Industry
 MNS: Mongolian National Standard
 MRPA: Mineral Resources and Petroleum Authority
 MRTD: Ministry of Road and Transport Development
 NAMEM: National Agency for Meteorology and Environment Monitoring
 NCEPR: National Committee for Environment Pollution Reduction
 NPREP: National Program on Reducing Environment Pollution
 NRTC: National Road Transport Center
 PTSD: Public Transportation Service Department of the Capital City
 PM: Particulate Matter
 RSD: Remote Sensing Device
 TCC: Traffic Control Center of the Capital City
 TPP: Thermal Power Plant



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(DRAFT)

MINUTES OF MEETINGS

BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY,

DEPARTMENT OF AGAINST AIR POLLUTION OF CAPITAL CITY OF
MONGOLIA

AND

MINISTRY OF ENVIRONMENT AND TOURISM OF MONGOLIA

ON

CAPACITY DEVELOPMENT PROJECT FOR AIR POLLUTION CONTROL IN
ULAANBAATAR CITY PHASE 3 in MONGOLIA

Department of Against Air Pollution (hereinafter referred to as "DAAP") of the Capital City of Mongolia, Ministry of Environment and Tourism (hereinafter referred to as "MET") of Mongolia (hereinafter referred to as "the Counterparts") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") hereby agree that the Record of Discussions on the Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3 in Mongolia (hereinafter referred to as "the Project") signed on ●●, will be amended as follows. It is noted that the Overall Goal and the Project Purpose shall not be amended.

1. Project Design Matrix (hereinafter referred to as "PDM")

Before (1.2)	Amended Version (1.3)
(1) Project Duration	
November 2018 to April 2023 (4 and half years)	November 2018 to July 2024 (5 years and 9 months)
(2) Output Indicator for Output 6-2	

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B.1



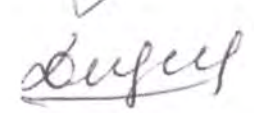
6-2. More than 3 pollution control measures and technologies are funded by <u>Air Pollution Against Fund</u> by utilizing technical appraisal guideline provided by the Project.	6-2. More than 3 <u>air</u> pollution control measures and technologies are funded by <u>the sections of the relevant agencies in charge of allocating funds</u> for <u>air pollution control</u> by utilizing technical appraisal guideline provided by the Project.
(3) Means of Verification of Output 6-2	
<u>Air Pollution Against Fund Operation reports</u>	<u>Minutes of Meeting of National Committee for Environmental Pollution Reduction (hereinafter referred to as "NCEPR")</u>
(4) Important Assumptions	
1. Legal and political framework for air quality management is maintained, which defines decision making mechanism such as NCEPR and professional agencies like DAAP and National Agency for Meteorology and Environment Monitoring (hereinafter referred to as "NAMEM").	1. Legal and political framework for air quality management is maintained, which defines decision making mechanism such as NCEPR and professional agencies like DAAP and National Agency for Meteorology and Environment Monitoring (hereinafter referred to as "NAMEM").
(newly added)	2. The COVID-19 pandemic situation will be improved and JICA will be able to send JICA Experts to Mongolia toward April 2021 until the end of the Project.
(5) Activities	
(newly added)	1-3-3 JICA Experts conduct training to National Road Transport Center (hereinafter referred to as "NRTC"), in addition to DAAP, on vehicle emission measurement using on-board emission measurement system, and DAAP and

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	NRTC implement vehicle emission measurement using on-board emission measurement system.
4-5 NCEPR utilizes the Outputs of the Projects and pilot projects implementation and assessment <u>for operation of Anti-air Pollution Fund.</u>	4-5 NCEPR, <u>or the sections of the relevant agencies in charge of allocating funds for air pollution control in the Mongolian government such as the Environment and Climate Fund utilizes the Outputs of the Projects and pilot projects implementation and assessment.</u>
6-5 JICA Experts provide training on air pollution control measures for <u>Anti-air Pollution Fund staff.</u>	6-5 JICA Experts provide training on air pollution control measures <u>and technical appraisal guidelines for staff of the sections of the relevant agencies in charge of allocating funds for air pollution control.</u>
6-6 <u>Fund staff</u> with JICA Experts improve relevant operations with <u>funding</u> for air pollution control measures, if necessary.	6-6 <u>Staff of the sections of the relevant agencies in charge of allocating funds for air pollution control</u> with JICA Experts improve relevant operations with <u>allocating funds</u> for air pollution control measures, if necessary.
Reason: Amendment and update on the stated items of the current version of PDM was necessary for the following reasons; (1) Since the restriction on travel to Mongolia due to COVID-19 caused the significant delay of implementation of the project activities from its original plan. (2) The Air Pollution Against Fund has been abolished and revenue from the air pollution charge has been decided to be consolidated into the Environment and Climate Fund according to the amended law and the revision of the Air Law, but it is not yet functioning. The budget is spent by the related ministries to implement environmental pollution control measures, according to the implementation plan (action plan) which was approved by the board members of NCEPR, including Vice Ministers of the related ministries, the mayor of Ulaanbaatar City, and the project leader. (3) The on-board vehicle emission measurement system provided to NAMEM in the Project phase 2 is no longer in use due to the absence of the person in charge. In 2019, the Ministry of Road and Transport Development (hereinafter referred to as	

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“MRTD”) requested NAMEM to transfer the system to the National Road Transport Center (hereinafter referred to as “NRTC”), which is an agency affiliated with MRTD, and the system was transferred to NRTC. In order to utilize the provided system and to conduct measurement for the pilot project, it became necessary to train NRTC staff.

This amendment will become effective from the date of both signing.

, XX XX, 2021

For
JAPAN INTERNATIONAL
COOPERATION AGENCY

Ms. TAMURA Eriko
Chief Representative
JICA Mongolia Office
Japan International Cooperation Agency

For
ULAANBAATAR CITY

Mr. Tumurtumuu ZUNDUI
Project Leader of Capital City in
Charge of Air and Environmental Pollution

For
GOVERNMENT OF MONGOLIA

Mr. Batmunkh DASHDEMBEREL
Director General
Environment and Natural Resources
Management Department,
Ministry of Environment and Tourism,
Mongolia

For
GOVERNMENT OF MONGOLIA

Mr. Batkhuu IDESH
Director General
Development Financing Department
Ministry of Finance, Mongolia

Annex V Coordination Rule between the Project and the relevant projects supported by other development partners such as ADB, UNICEF and SDC.

Focal point at DAAP for coordination

Project Director is the focal point at DAAP for coordination between the JICA Phase 3 Project and relevant projects supported by other development partners such as ADB, UNICEF and SDC. The DAAP focal point will be involved in the following possible coordination activities between the JICA Phase 3 Project and the other development partners' projects.

(1) Communication between JICA project experts and other development partners projects.

JICA project experts and other development partners' projects would communicate freely each other. Should any problem arise, they would report to and consult with JICA and the relevant development partners respectively for proper actions. The DAAP focal point shall be updated periodically on the communication status by the JET.

(2) Information exchange rule

For effective implementation of the both of JICA Phase 3 and other development partners' projects, smooth reciprocal information exchange including technical data is encouraged between them. The JICA Project Experts would provide such information upon request by projects of other development partners, JICA Project Experts may consult with the DAAP focal point and JICA, if needed to provide such information. The use of technical data obtained from JICA Phase 3 must be limited within the other development partners' project activities. In utilizing such data, the both sides will indicate the source of information.

(3) Exchange of observers between JICA Phase 3 JCC, C/P-WG meeting and relevant meetings in other development partners' project.

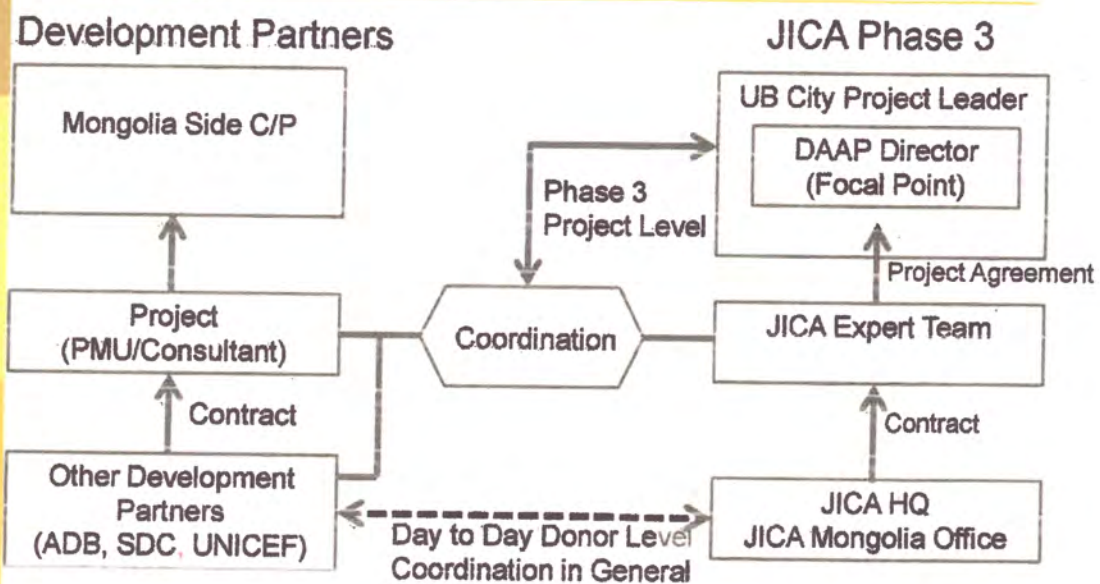
The JICA Phase 3 JCC and C/P-WG meetings would invite observers from the other development partners and their projects to facilitate better coordination with no objection by the DAAP focal point. Likewise, the other development partners are expected to invite observers from JICA or JICA-designated JICA Project Experts. The DAAP focal point shall be updated periodically on such exchange of observers by JET.

(4) Possible coordinating project activities

Specific areas for coordination will be examined in the course of implementation of the Project.



Donor Coordination Mechanism for Other Development Partners(ADB, SDC, UNICEF)



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MINUTES OF MEETING OF
THE FIFTH JOINT COORDINATING COMMITTEE MEETING
ON JAPANESE TECHNICAL COOPERATION FOR
CAPACITY DEVELOPMENT PROJECT FOR AIR POLLUTION CONTROL IN
ULAAANBAATAR CITY PHASE 3 in MONGOLIA

The Japan International Cooperation Agency (hereinafter referred to as "JICA") Supervisory Team for "Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3 in Mongolia (hereinafter referred to as "the Project")", JICA Mongolia Office, and JICA Expert Team (hereinafter referred to as "JET") had a series of online video meetings with Department of Against Air Pollution of Capital City (hereinafter referred to as "DAAP") and Joint Coordinating Committee (hereinafter referred to as "JCC") members from 11th June to 24th June 2021 to discuss the Monitoring Sheet No.5, and held the forth Counterpart Working Group (hereinafter referred to as "C/P-WG") meeting on 17th June and the fifth JCC meeting of the Project chaired by Ms. Purevsuren BOLOOJ, JCC Acting Chair Person on 24th June 2021. Participants list of the fifth JCC meeting is shown in Annex I.

Japanese side and the Mongolian authorities had a series of discussions. As a result of discussions, both sides agreed on matters referred to the document attached hereto.

The parties acknowledge and agree that this Minutes of Meetings may be executed by electronic signature, which is considered as an original signature for all purposes and has the same force and effect as an original signature. "Electronic signature" includes faxed versions of an original signature or electronically scanned and transmitted versions (e.g., via pdf) of an original signature.

Tokyo and Ulaanbaatar, 08 July 2021

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Mr. Eriko TAMURA
Leader, JICA Supervisory Team,
Chief Representative
JICA Mongolia Office
Japan International Cooperation Agency,
Japan,



Mr. Tumurtumuu ZUNDUI
Project Leader of Capital City in
Charge of Air and Environmental
Pollution, Mongolia

田畑 亨

Mr. Toru TABATA
Leader, JICA Expert Team, Japan



Mr. Batkhuy IDESH
Director General
Development Financing
Department
Ministry of Finance, Mongolia

ATTACHED DOCUMENT

I. The Monitoring Sheet No.5

JET presented the progress of the Project, future activity plan, and issues that the Project is facing since its beginning. After active discussions, the JCC approved the Monitoring Sheet No. 5.

Revision of the Project Design Matrix (II to III)

II. Revision of the Project Design Matrix (Objectively Verifiable Indicators)

The Japanese side proposed the revision of the Project Design Matrix (hereinafter referred to as PDM), and both sides agreed on the revision of the PDM. Annex II shows the changes to PDM.

1. Objectively Verifiable Indicators 1-2

"The emission measurement reports are submitted to the Deputy Governor of Ulaanbaatar (hereinafter referred to as "UB") City at least 3 times during the Project period."

will be replaced by;

"The emission measurement reports are submitted to the Project Leader of UB City in Charge of Air and Environmental Pollution at least 3 times during the Project period."

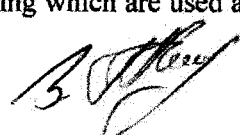
III. Additional activity of PDM

At the 4th JCC, the DAAP requested the Japanese side to support the transfer of the monitoring data of Dambadarjaa station to the air quality monitoring network. The Japanese side agreed to support the examination of the data transfer method to the network, and the establishment of the data transfer system after studying the current status. The Japanese side proposed the following additional activities, and the Mongolian side agreed to add the Activity 1-4-10.

"Activity 1-4-10 DAAP with JICA Experts establishes the data transfer system of air quality monitoring data of Dambadarjaa station to the online information system of Air Quality Monitoring Station (hereinafter referred to as "AQMS")."

IV. Request from the Japanese side on the issues on the future project activities

The Japanese side and the Mongolian side agreed that Tavan Tolgoi Tulsh LLC (hereinafter referred to as "TTT") would produce the sample of the improved fuel in the 3rd JCC in 2019. In order to produce the improved fuel, the crusher that was provided by the Project to the Ministry of Energy (hereinafter referred to as "ME"), and installed in TTT shall be utilized. The Japanese side will train the production method of the improved fuel for the pilot project, and provide biomass and desulfurization agents if necessary. The Mongolian side was requested to provide UHG middling which are used as material by



TTT, and for producing improved fuel (7.5 tons for each type), including the sample of the fuel for the pilot project. In order to compare with the improved fuel of TTT, the Japanese side requested the Mongolian side to provide 7.2 tons of improved fuel of TTT. DAAP responded that DAAP has sent an official letter requesting 7.2 tons of improved fuel of TTT for the pilot project, and producing 7.5 tons of the improved fuel of the pilot project by TTT. DAAP responded that DAAP had not received any answer from TTT, and DAAP would ask TTT for an official reply. The Japanese side mentioned that it is necessary to respond to the current issues as soon as possible, in order to achieve concrete results quickly, as the Project Leader pointed out. The Japanese side asked for the cooperation, especially in the pilot project of improved fuels, including the provision of improved fuels by TTT.

V. Request based on the 4th JCC

1. Establishment of working group of improved fuel

The Mongolian side and Japanese side agreed to establish the working group by April 2021, which has not yet been realized. The Japanese side requested that ME should establish the working group of improved fuel by August 2021, in order to report the result of combustion test of improved fuel made in the first pilot project at the lab, and to discuss the result and cost effectiveness of emission reduction.

2. Introduction of Remote Sensing Device (hereinafter referred to as "RSD") and elaboration of the legal system about RSD

At the 4th JCC held in January 2021, the Japanese side requested to introduce the RSD and elaborate the legal system by April 2021. As a current situation, cost for purchase of the RSD is included in the budget for construction of new road between Ulaanbaatar city and Darkhan city. However, the Mongolian side is now looking for funding for the construction. Also, the legal system to implement emission control using the RSD is planned to be established after acquiring the RSD. It is important to develop the pilot project into full-scale project by the Mongolian side. Therefore, JET requested that the Ministry of Road and Transport Development (hereinafter referred to as "MRTD") and the Public Transportation Service Department of the Capital City (hereinafter referred to as "PTSDC") make decision on the introduction of the RSD by April 2023, and that the legal system to implement emission control using the RSD be in place by July 2024. JET will continue to monitor the progress of this request with MRTD and PTSDC.

3. Planning of the budget for traffic signal control operation

At the 4th JCC held in January 2021, the Japanese side requested the Traffic Control Center (hereinafter referred to as "TCC") to secure the budget for the traffic condition survey and so on, for the operation of the traffic signal control and to establish the operation system. The JET requested TCC to prepare the budget for traffic condition



surveys by April 2024, as it is important to improve the operation of traffic signal control for whole UB city, not just for the pilot project. JET will confirm TCC's intention on this issue.

4. Capacity development of RSD and on-board emission measurement system

At the 4th JCC held in January 2021, the Secretary General of the National Committee for Environment Pollution Reduction (hereinafter referred to as "NCEPR") requested that the Inspection Agency of Capital City (hereinafter referred to as "IACC") and the Ecology Police Department (hereinafter referred to as "EPD") should participate in the capacity development of RSD and on-board emission measurement system. The Japanese side requested the Mongolian side (DAAP) to confirm their intention to join the relevant project activities. Also, JET replied that it would be possible to have IACC and EPD participate in the activities of the technology transfer of RSD and on-board emission measurement system.

VI. Requests regarding the issues and the obstacles for the pilot projects to expand to full-scale implementation by the Mongolian side

1. Sales of auto-vehicle low-sulfur fuel

The Ministry of Mineral and Heavy Industries (hereinafter referred to as "MMHI") is submitting a bill to the Diet to revise the Air Law in order to stipulate the sales of EURO5 fuel in the Air Quality Improvement Areas. In addition, MMHI has submitted a bill to the Ministry of Finance to eliminate the price gap between existing fuels and EURO5 fuel by taxation in order to promote the sale of low-sulfur fuels. The efforts by the Mongolian side and progress toward a full-scale project by the Mongolian side were confirmed.

2. Installation of PM reduction equipment (DPF) and introduction of low emission vehicles

MRTD has introduced a transportation fund and established a working group to study the production of DPF in Mongolia and the purchase of cheaper products from abroad. It is also planned that 780 buses without PM emission reduction devices that have been in use for the 12 years or more will be scrapped. Electric bus, Compressed Natural Gas (hereinafter referred to as "CNG") bus, and EURO5 bus (with DPF) are the possible alternative measures. The progress toward a full-scale project by the Mongolian side was confirmed. JET has submitted to MRTD and the NCEPR a cost comparison chart (which can be used to compare the total cost including initial and running costs) that can be used when purchasing the buses. When purchasing buses, it is necessary to compare and examine the total cost of procurement including the vehicle price and fuel costs, after carefully examining the costs considering actual situation in Mongolia.

3. Introduction of the equipment for driving management for promotion of eco-driving

and development of legal system

MRTD has an activity to improve the road safety, but there is no plan to install driving management devices, or to develop the legal system to obligate to install them. The pilot project and the preparation for the full-scale project by the Mongolian side is not proceeding well.

VII. Other Issues

1. Secretary General of NCEPR requested the following to the Japanese side;
 - (1) The Secretary General of NCEPR fully agreed with the project's air pollution control activities. Also, he agreed with the team's proposal to solve the problem in the presentation on the pilot projects to be implemented. As for diesel vehicles, an additive to the fuel to improve the quality of the fuel will be tested on its effects on emission reduction. Surveys and measurements of the actual emission from vehicles will serve as basic data for the establishment of a legal system for regulating vehicle emissions. In regulating vehicle emissions, the Secretary General stated that the NCEPR, Ministry of Environment and Tourism, and UB City need to cooperate to create a system for issuing fines and improvement orders. The Secretary General requested the Project to support such surveys based on on-board vehicle emission measurements along with the Project implementation.
 - (2) The Secretary General mentioned that the Air Quality Improvement Areas consisted of central 6 districts of UB city last year, and Nalaikh district has added this year. The Secretary General would like to use the results of the survey on the actual vehicle emissions by RSD and so on as a basis for the legal development of the introduction of EURO5 fuel. Therefore, the Secretary General requested the Japanese side to start vehicle emission gas measurement such as RSD as soon as possible.
 - (3) Heat Only Boiler (hereinafter referred to as "HOB") still exists and raw coal is used in the Ger area. In the future, it will be important to install monitoring sensors and control systems to monitor the status of exhaust gas from stationary sources including Coal Fired Water Heater (hereinafter referred to as "CFWH"). The Secretary General is also considering charging fees on high-emitting polluters including vehicles, in addition to the CFWH and HOB. The Secretary General requested the Japanese side to provide technical support including the supply of monitoring sensors of exhaust gas condition.
 - (4) Currently, there are 12 air quality monitoring stations in UB City, and the Secretary General would like to increase the number of air quality measurement stations to 30 to cover the entire UB City. The Secretary General requested the Japanese side to provide additional air quality monitoring stations.



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Ms. Purevsuren of DAAP mentioned that the opinion from the Secretary General will be recorded as there will be a Minutes of Meeting consultation after the JCC meeting.

The Japanese side replied that the Japanese side could respond to various requests only within the scope of the implementation of the pilot projects and activities which were already agreed upon for this project, so it would be difficult to accommodate the requests requiring significant increase of additional personnel, budget, or equipment.

2. Mr. Batbayar of National Agency for Meteorology and Environment Monitoring (hereinafter referred to as "NAMEM") requested the support from the Japanese side for preparation of emission factors, as the emission factor is becoming important more and more with the introduction of improved fuels. JET responded that it was possible to prepare emission factors when a lot of measurement data was collected, since DAAP is conducting emission gas measurement of improved fuel made by TTT. JET also mentioned that DAAP should obtain permission from TTT to use the combustion test data, since the combustion test was conducted based on contract between DAAP and TTT.
3. Mr. Nyamdorj of PTSDC said that DPFs have been installed in 24 large buses as part of JICA cooperation "Verification Survey with the Private Sector for Disseminating Japanese Technologies for Emission Reduction of Particulate Matter (PM) from Diesel Buses by DPF Suitable for Ulaanbaatar Condition". The DPF equipment has been handed over to the relevant city agencies. As those 24 Buses will retire in December 2021, the city is planning to transfer the DPFs to other buses. The Mongolian side requested the Japanese side to provide technical support for the reloading of the DPFs. The Japanese side responded that Japanese side would welcome the use of DPFs and that JET would consider what kind of technical support JET could offer.
4. Mr. Khishigjargal of United Nations International Children's Emergency Fund (hereinafter referred to as "UNICEF") mentioned that reducing air pollution is important, and as promised in the Paris Agreement of the United Nations Climate Change Convention, Mongolia is required to understand the actual Greenhouse Gas (hereinafter referred to as "GHG") emissions and GHG reduction in terms of co-benefit with air pollution. UNICEF requested the Japanese side to cooperate in the calculation of GHG emissions. The Japanese side responded that it is not supposed to estimate GHG emission in this Project, but another JICA project, "Project for capacity development to establish a national GHG inventory cycle of continuous improvement" is underway, so UNICEF should consult with that project if necessary. In addition, since the framework of cooperation and coordination with donors has



agreed in this Project, UNICEF could request the DAAP Director to provide any relevant information for GHG estimation, if necessary.

5. Mr. Barkhasragchaa of Central Laboratory of Environment and Metrology (hereinafter referred to as "CLEM") repeated the request made in the 4th JCC again, to support for repair and maintenance of the equipment provided in Phases 1 and 2 of the project when equipment are malfunctioning. The Japanese side responded that the Japanese side needed to know the status of the equipment, so JET would investigate the equipment and make a decision when the trip to Mongolia becomes possible. Although CLEM is basically responsible for the maintenance of the equipment after the projects handed over them to CLEM, it is possible for JET to cooperate in terms of the support for communication with manufacturers and so on.

VIII. Other Comments from the Mongolian side

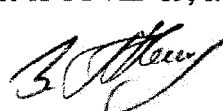
1. Mr. Batbayar of NAMEM commented that the lack of field interaction in Mongolia due to COVID-19 might have affected to the lack of full implementation of the project. It is appreciated to see that connection of the Dambadarjaa AQMS to the integrated monitoring network was accepted. In the future, when JET provides recommendations and advice on air pollution control measures through the pilot projects, it is important to make the decision-makers and related organizations (ministries and agencies) understand the importance of not only short-term feasible measures but also the consideration of the introduction of Clean Technology (zero emissions) as a long-term measure.

IX. Remarks by Mr. Tumurtumuu ZUNDUI, Project Leader of Capital City in Charge of Air and Environmental Pollution

It is desirable that this meeting will be a good opportunity to clarify concrete solutions and lead to future activities. Under the influence of COVID-19, UB city is continuing the project with Ulaanbaatar Clean Air Project (hereinafter referred to as "UBCAP") and donors such as the Asian Development Bank (hereinafter referred to as "ADB") achieving good results. It is necessary and expected that this project will quickly achieve visible results, and that both the Mongolian and Japanese sides will actively promote the implementation of activities as soon as possible.

X. Remarks by Ms. Eriko TAMURA, Leader of JICA Supervisory Team

In the project activities, it is expected that the stakeholders related with the Project will work together to measure and verify the effectiveness of the air pollution control measures. It is important to determine strategy and policy for improving the air pollution control measures based on the results of verification. Although the progress of the pilot projects on improved fuels and vehicles have been delayed due to the impact of COVID-19, it is


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requested that the evaluation and analysis of lessons derived from the results of the pilot project will lead to a realization of full-scale project in Mongolia. As a result of replacement of raw coal with improved fuel, PM10 and PM2.5 are decreasing, but SO₂ is increasing, reaching high concentration in last May. The early establishment of a working group on the pilot project for improved fuels is expected.

As the budget compilation is ongoing now, it is expected that the items which were agreed upon at last JCC but not fully budgeted for, and the items which are agreed upon at this JCC will be reflected in the budget.

XI. Conclusions by Mr. Taizo YAMADA, JICA Supervisory Team

I appreciate the active discussion by the JCC members from the Mongolian side. JICA has been supporting the Mongolian side to build their capacity for air pollution control through Phase 1, Phase 2 and this Project phase 3 for more than 10 years. In the opening presentation, Ms. Purevsuren indicated that the Mongolian people have made significant air quality improvements of PM10 and PM2.5 in the winter by their own efforts. Also, I was very impressed that the Mongolians side evaluates that scientifically and objectively by themselves. This is a remarkable progress compared to the situation 10 years ago. In order to further reduction of emission and improvement of the air quality, this Project phase 3 aims to implement pilot projects for air pollution control, which will be developed into full-scale projects by the Mongolian side during the remaining period of the Project phase 3. Through these activities in addition to the technical capacity building, Japanese side would like to support the Mongolian side in developing capacities for allocating resources, and for establishing coordination, necessary laws and regulations for air quality improvement. I hope that the Mongolian side will make use of the pilot projects for their own such a capacity building.

XII. Conclusions by Ms. Purevsuren BOLOOJ, JCC Acting Chair Person

Under JICA's 10-year support for capacity building in air pollution control, the Mongolian side has seen remarkable progress in air pollution control and improved air quality. In the last three years, the Mongolian side has been able to reduce air pollution by 50% as a result of the efficient and effective measures implemented. I believe that this is due to the effective decisions, policies, strategies and measures taken by the Mongolian government, including donor agencies. In order to achieve the expected results from the Project, it is important to clarify the roles between the Japanese and Mongolian sides and to fulfill those responsibilities. Requests to the Mongolian side for project activities will be discussed and addressed. It was reaffirmed that it is important to actively participate in the pilot project so that concrete results can be achieved. I hope that the Japanese side will actively consider accelerating the implementation of the activities and achieving the expected results. Today's meeting clarified what both the Japanese and Mongolian sides need to do in order to achieve the project goals.

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END

ANNEX I Participants of Fifth Joint Coordination Committee

ANNEX II Presentation of Monitoring Sheet No.5, Revised Activity Plan and
Important Issue

ANNEX III PDM (ver. 1.4)



B. M. Heng

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ANNEX I Participants of Fifth Joint Coordination Committee

	Name	Organization	Position
1	Tumurtumu ZUNDUI	Ulaanbaatar City	Project Leader of Capital City
2	Altanzul	Secretariat of the National Committee for Air Pollution Reduction	Secretary General
3	Ch. Chuluunbat	Ministry of Mining and Heavy Industry, Fuel Policy Department	Director General
4	D. Davaabayar	Ministry of Mining and Heavy Industry, Fuel Policy Department	Officer
5	Baysgalan	Ministry of Road and Transport Development, Policy and Planning Department Air Pollution Reducing and Green Development	Officer
6	D.Bolormaa	Ministry of Construction and Urban Development, division of Policy and Planning	Officer
7	J. Batbayar	National Agency for Meteorology and Environment Monitoring Environment Monitoring Division	Head of Division
8	Enkhmaa	National Agency for Meteorology and Environment Monitoring Network Division	Officer
9	B. Barkhasragchaa	Central Laboratory of Environment and Metrology	Senior Officer
10	Munkhbold	Mayor's office Development Policy Planning Department	Head of Division
11	Nyamdorj	Public Transport Service Department	Officer
12	Narangerel	Inspection Agency of the Capital City Division of Air Quality Control	Head of Division
13	S.Enkhtur	Traffic Planning, Coordination and Engineering Department of Capital City	Head of Division
14	N.Bilegsaikhan	Urban Regulation, Environmental Safety Control Coordination Department Environmental Safety Control Division	Head of Division
15	D.Nomin	Urban Regulation, Environmental Safety Control Coordination Department Environmental Safety Control Division	Officer
16	Purevsuren BOLOOJ	Department of Against Air Pollution of the Capital City	Acting Head of DAAP
17	T. Tsolmon	Department of Against Air Pollution of the Capital City	Acting Deputy Head of DAAP
18	Urantseyseg	Department of Against Air Pollution of the Capital City, Department of Air Quality Management	Officer
19	G. Amartuvshin	Thermal Power Plan-3, Technical policy Division	Head of Division
20	Taizo YAMADA	JICA Headquarter JICA Supervisory Team	Senior Technical Advisor (Environment)
21	Hideaki MATSUOKA	JICA Global Environment Department Environmental Management Group Environmental Management Team 1 JICA Supervisory Team	Director
22	Itaru CHIBA	JICA Global Environment Department Environmental Management Group Environmental Management Team 1 JICA Supervisory Team	Deputy Director
23	Eriko TAMURA	JICA Mongolia Office	Chief Representative

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24	Atsuki TAKEDA	JICA Mongolia Office	Project Formulation Advisor
25	Ch. MUNKHMANLAI	JICA Mongolia Office	National Staff
26	Toru TABATA	JICA Expert Team	Chief Advisor
27	Natsuji SAWAKI	JICA Expert Team	Sub Leader
28	Ei EDO	JICA Expert Team	Chief Sub Group Leader
29	Hajime ENDO	JICA Expert Team	Clean Coal Technology / Pilot Project for Improved Fuel 1
30	Jun OKABE	JICA Expert Team	Auto-mobile Emission Control 2/ Emission Measurement for Mobile Sources
31	Shinya NAKATA	JICA Expert Team	Air Quality Simulation Model / Air Pollution Control Measures Evaluation / Emission Inventory
32	P. Ongonsar	ADB	Consultant
33	Khishigjargal Batjantsan	UNICEF	Officer
34	Sunder Erdenekhuyag	UNICEF	Officer
35	A.Nomunzul	UNICEF	Officer



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ANNEX II Presentation of Monitoring Sheet No.5, Revised Activity Plan and Important Issue

Монгол улс Улаанбаатар хотын Агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх төсөл (3 дугаар үе шат) ХЗХ-ны 5 дугаар хуралдаан 2021 оны 6 сар ЖАЙКА төслийн баг	1. Гүйцэтгэлийн тайлан дугаар 5-ын ерөнхий агуулга ■ 2018 оны 11 сараас 2024 оны 7 сар хүртэл 5.9 жилийн хугацаатай "Монгол улс Улаанбаатар хотын агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх төслийн 3 дугаар үе шат" хэрэгжиж байна. Тус гүйцэтгэлийн тайлан-5-д 2020 оны 11 сараас 2021 оны 4 сар хүртэл хугацаанд хэрэгжүүлсэн үйл ажиллагааг тусгасан болно
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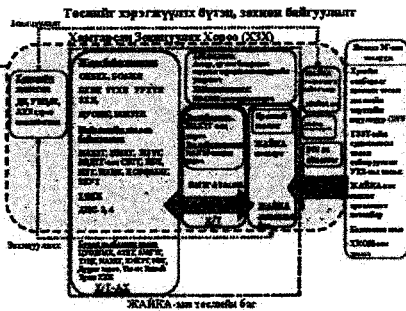
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ХЗХ-ны 5-р хурлын зорилго 1. Гүйцэтгэлийн тайлан /Дугаар 5/-г батлах (У/а хамруулсан хугацаа: 2020/11-2021/04) 2. Цаашдын үйл ажиллагааны төлөвлөгөөг батлах (Гүйцэтгэлийн тайлан-5 -д тусгах) 3. Өнөөгийн тулгамдсан асуудал, ХЗХ-ны 5-р хурлаар хэлэлцэх зүйлс 3.1 Хэрэгжилтэй холбоотой хүсэлт 3.2 ХЗХ-ны 4-р хурлаар хэлэлцсэн асуудлыг нягтлах 4. Япон талын саналыг Монгол талас зөвшөөрөх асуудал 4.1 ТТМ-ын үр дүнгийн шалгуур үзүүлэлтийн өөрчлөлт 4.2 ТТМ-д нэмэлтээр оруулах үйл ажиллагааны санал	Төслийн үр дүнд бай болгох агаар орчны хяналтын үзүүл
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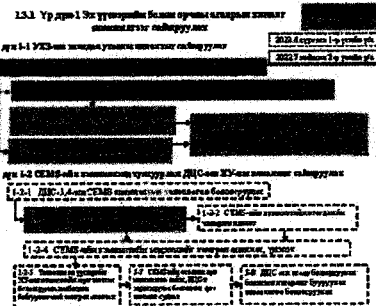


1.3. Үр дүнгийн хэрэгжилтийн явц

- COVID-19 цар тахлын нөлөөгөөр 2020 оны 3 сараас хойш Япон мэргэжилтэн Монголд ирж ажлаах боломжгүй болж, 2020 оны 2 сарын дундаас эхлэн ихэнх ү/а-ны хэрэгжилт зогссон.
- Япон мэргэжилтэн Япон улсаас Монгол талд онцгойгоор зайнаас хэрэгжүүлэх боломжтой ү/а-г судалж, 2020 оны 7 сараас хойш цочим хэлбэрээр ү/а 2-2, ү/а 5-3-ыг Х/Т-тай хамтран хэрэгжүүлж байна.

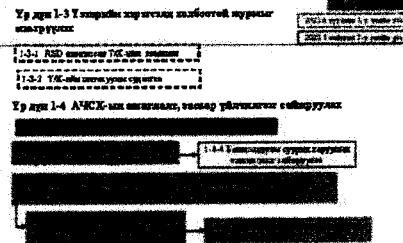
1.2. Хамтарсан Зохицуулах Хорооны хурал (ХЗХ), нээлтийн семинар

- 2021 оны 1 сарын 21-д Х/Т-АХ-ийн 3-р хурал, 2021 оны 1 сарын 27-д ХЗХ-ны 4-р хуралданыг тус бүр зохион байгуулсан.
- ХЗХ-ны 4-р хурлаар төсвийн хугацааг 2018 оны 11 сараас 2023 оны 4 сар хүртэл 4.5 жил байсныг 2018 оны 11 сараас 2024 оны 7 сар хүртэл 5.9 жил болгон Япон, Монгол талнаас зөвшилцөж сундгасан.
- ХЗХ-ны 4-р хурлаар үр дүнгийн шалгуурыг баталгаажуулж, Төсөл Төлөвлөгөөний Матриц (ТТМ)-ын хувиар 1.3 болгож өөрчилсөн.
- ХЗХ-ны 4-р хурлаар Монгол талын Х/Т-АХ-д Таван Тонгой Түлш ХХК-ыг гишүүнээр нэмж баталсан.
- ХЗХ-ны хурлаар Монгол талын ЗХУТ-ийг ХЗХ-ны гишүүнээр нэмж баталсан.



1.2. Хамтарсан Зохицуулах Хорооны хурал (ХЗХ), нээлтийн семинар

- ХЗХ-ны 4-р хурлаар НАБТТ-ын БХХ-ийн дарга, газрын хэд дарга Цолмог төсвийн захирааг, АЧХХ-ийн даргыг төсвийн менежерээр томилох асуудлыг лийдэрлэсэн.



Үр дүн-1 Эх үүсвэрийн болон орчны агаарын хяналт шинжилгээг сайжруулах
Хэрэгжилтийн байдал (2020/11-2021/04)

Голлох үйл ажиллагаа:

- ХЗХ-ны 4-р хурал үед АСХУХ-ыг шинэжж хүср багатай шатаах хэрэгсэл тохиолдолд агаар бохирдуулж буйг бууруулах багалгажуулах хэмжээг хийхгүйг УУХУХ-ас Япон мөргөжилтэнд хүсэлт тавьсан. АСХУХ-ийг шинэжж хүср багатай хийн бууруулах тодорхойлох боломжгүй хэрн хүср багатай хийн SO₂ агаарын хэмжээг шатаах дахь хүср багатай агууламгийн хэмжээгээр тооцолох боломжтой.
- ХЗХ-ны 4-р хурал үед НАБТГ-ын зүгээс Дамбадаржагийн АЧХ-ын хэмжээний агаарыг агаар орчны мониторингийн сүлжээнд холбоход дэмжлэг үзүүлэхийг хүссэн бөгөөд Япон мөргөжилтэнд агаар орчны мониторингийн сүлжээнд хэмжээний агаарыг дамжуулах талаар судалж үзсэн.
- НАБТГ-ын АЧХ-ыг харуусан мөргөжилтэнд хэмжээний тоног төхөөрөмжийн ажиллагааг дотоодтой холбоотой Япон мөргөжилтэнд зөвлөгөө авч авчээ.

1.3.2 Үр дүн-2 Бүтэн жилийн агаарын бохирдлын бүтцийн шинжилгээ, үнэлгээний чадавхыг сайжруулах

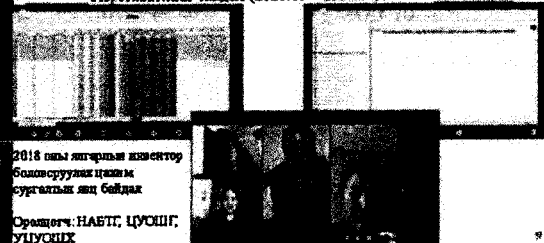
Хэрэгжилтийн байдал (2020.11 – 2021.04)

Голлох үйл ажиллагаа:

- РМ-ын сорь авах ажлын төлөвлөгөө боловсруулсан.
- Эх үүсвэрийн инвентор шинэчлэх төлөвлөгөө боловсруулсан.
- 2017 оны алгарлын инвенторын тайланг боловсруулсан.
- Япон мөргөжилтэнд НАБТГ, ЦУОШГ, УЦУОШХ-д хандах 2018 оны алгарлын тооцоолон, өгөгдөл боловсруулах талаар цахим сургалт зохион байгуулж байна.

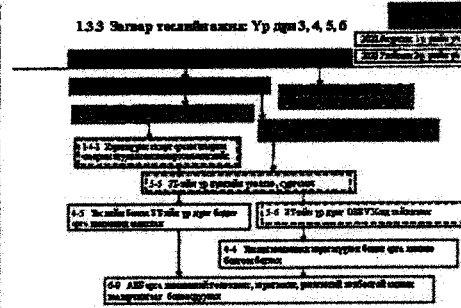
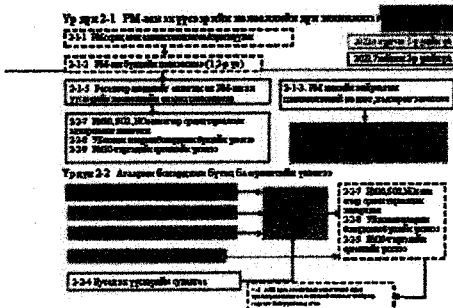
1.3.2 Үр дүн-2 Бүтэн жилийн агаарын бохирдлын бүтцийн шинжилгээ, үнэлгээний чадавхыг сайжруулах

1.3.2 Үр дүн-2 Бүтэн жилийн агаарын бохирдлын бүтцийн шинжилгээ, үнэлгээний чадавхыг сайжруулах
Хэрэгжилтийн байдал (2020.11 – 2021.04)



2018 оны алгарлын инвентор боловсруулах цахим сургалтын явц байдал

Оролцогч: НАБТГ, ЦУОШГ, УЦУОШХ



1.8

Голдех үйл явцлаган:

- УБ хот орчимын хэд хэдэн амралтын газруудаас ахуйн хэрэгслэлийн сайжруулсан ихэмхл тулшгийн загвар төслийн хэрэгжүүлэх газрыг судалсан.

- ## Анхаарал хандуулсанд баярлална

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Монгол улс Улаанбаатар хотын Агаарын
бохирдлын хяналтын чадавхыг бэхжүүлэх төсөл
(3 дугаар үе шат)
ХЗХ-ны 5 дугаар хуралдаан

2021 оны 6 дугаар сар
ЖАЙКА төслийн баг

2.1 Үйл ажиллагааны төлөвлөгөө (2)

- Цахим хэлбэрээр зайнаас хэрэгжүүлэх боломжтой "ДЦС 3, ДЦС 4 нь СЕМС-ийн өгөгдөлд тулгуурласан чанарын хяналтыг бэхжүүлэх (У/а 1-2)", "У/а 1-4 Дамбалдаржаа АЧСХ-ын хэмжилтийн өгөгдлийг агаарын чанарын нэгдсэн мэдээллийн системд холбоход ЖАЙКА мөргөжилтийн дэмжлэг авах", "У/а 2-2 Агаар орчны тархалтын загварчлал, рецептор модель ашигласан агаарын бохирдлын бүтэц, ертөнцийн үнэлгээ", "У/а 5-3 Сайжруулсан шахмал түлшний үйлдвэрлэлийн технологи сайжруулахад зөвлөх", "У/а 5-4 Загвар төслийн бэлтгэл хангах ажил" эдгээр үйл ажиллагааг хил хорио цуцлах хүртэл хэрэгжүүлж, бусад үйл ажиллагааг хил хорио цуцлагдсанаас хойш хэрэгжүүлэхээр болсон.

ХЗХ-ны 5-р хурлын зорилго

1. Гүйцэтгэлийн тайлан (Дугаар 5-г батлах (У/а хяруулсны хуралдаан: 2021/11-02/104)
2. Цаашдын үйл ажиллагааны төлөвлөгөөг батлах (Гүйцэтгэлийн тайлан-5-д тусгах)
3. Энэсний тулгуурлан асуудал, ХЗХ-ны 5-р хурлаар хэлэлцэх асуудал
 - 3.1 Хэрэгжилтийн нөхцөл байдлыг хувиул
 - 3.2 ХЗХ-ны 4-р хурлаар хэлэлцсэн асуудлыг нягтлах
4. Япон талын санхүүг Монгол талд зөвшөөрөх асуудлыг
 - 4.1 ТТМ-ын үр дүнтэй шалгуур үзүүлэлтийн өөрчлөлт
 - 4.2 ТТМ-ийн мөнгөөр оруулж үйл ажиллагааны санхүү

2.2 Үйл ажиллагаа 1-2 СЕМС-ийг ашигласан хаягдал утааны хяналтыг бэхжүүлэх

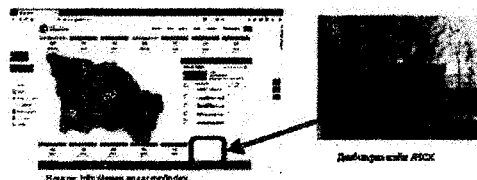
- ДЦС-3, 4-ийн засвар үйлчилгээний төлөвлөгөө болон гар хэмжилтийн нөхцөл байдлыг нягтлах
- Нэгдсэн системд холбоход шаардлагатай програм хангамжийн талаар суулгаж тодорхойлох
- БОАЖЯ, ЦУОПГ-аас хэрэгжүүлж СЕМС болон хаягдал утааны хэмжилтийн тайлан мэдээ хүлээлцж байгаа нөхцөл байдлыг нягтлах
- Дэрх нөхцөл байдлыг нягталж байхад илрсэн асуудалд зөвлөгөө өгч ажиллана.

2.1 Үйл ажиллагааны төлөвлөгөө (1)

- КОВИД-19 цар тахлын нөлөөгөөр хэрэгжилт ихэвчэн хоцрогдсон тул 2021 оны 8 сар хүртэл жилийн хориг цуцлагдана гэсэн төсөөлгөөр үйл ажиллагааны төлөвлөгөөнд өөрчлөлт оруулсан.

2.3 У/а 1-4 Дамбалдаржаа АЧСХ-ын хэмжилтийн өгөгдлийг агаарын чанарын нэгдсэн мэдээллийн системд холбоход ЖАЙКА мөргөжилтийн дэмжлэг (1)

- ХЗХ-ны 4-р хурал дээр НАБП-аас ЖАЙКА-д төмөр хүснэгтийн дагуу ЖАЙКА-ын мөргөжилтийн Дамбалдаржаа АЧСХ-ын хэмжилтийн өгөгдлийг агаарын чанарын нэгдсэн мэдээллийн системд холбоход дэмжлэг үзүүлнэ.



☐ Бэлтхонгуудын АЧСХ-ын хэмжээний өгөгдлийг дамжуулах өргөцөлийг санал болгоно.

- 2.5 Үйл ажиллагаа 2-2 Тархалтын загварчлал, рецептор модель**
ашигласан агаарын бохирдлын бүтэц, өртөгтийн үнэлгээ (2)

The image displays a highly degraded and low-contrast scan of a document. It features a grid-like structure with numerous columns and rows of text. The text is almost entirely illegible due to extreme contrast, noise, and what appears to be heavy redaction or a very poor quality of the original document. The layout suggests a complex table or a multi-column report, but no specific content can be discerned.

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1.1 РМ эх үүсвэрийн нөөцөллийн дүн шинжилгээний зөрлөг

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2.5 Үйл ажиглагч 2-2 Тархалтын загварчилал, ресептор модель шигтгэсэн явдрын бохирдлын бүтэц, өртөгтийн үнэлгээ (3)

- Сайхуурын шахмын түлшний хэвтүүлсэн 2020 оны эх үүсвэрийн нийлэвэрийг 2022 оны 1 сар хүртэл хуучингаар боловсруулах.
- ТТТ компанийн сайхуурын шахмын түлшний хэрэгсэлтэй эх үүсвэрийн нягтралын фактор технологийн үнэлгээ хийж, тооцоолнол шингэлж ялгарлын факторыг сонгох

- 2020 оны эх үүсвэрийн инвентарыг шингитсэн тархиагын загварчлалыг 2022 оны 5 сард багтаан боловсруулах.
- Боловсруулсан тархиагын загварчлалыг УБ хотын хүчээрлэг хяа SO2-ын бүсийг 2022 оны 8 сард багтаан тодорхой болгох.

2.5 Үйл ажиллагаа 2-2 Тархалтын загварчлал, ресептор модаль зинчилсэн агаарын бохирдлын бүтэц, өртөлтийн үнэлгээ (1)

Цэцэг хүрхүүс программийг ажиллан хэд хэдэн удаагийн сургалтын зохион байгуулалд байгаа бөгөөд НАБТ, ЦУОШГ, УЦУОСМХ-ийн хариуцаан мөргөлдөөнтэй илгээлтийн шинэчлэл, дигарлын тооцооноо, жилийн төлөвлөг, агаарын орчны төрхийн загварчлал боловсруулх арга-хүрхүүс тавьж сургалт зохион байгуулна.

2.6 Ахуйн хэрэглээний салбаруудын шахмал түлшний загвар төсөл

2.6.1 Зөвхөн төслийн сайжруулсан шахина түвшиний алгарын бууралтын үр дүнт баталгаажуулах ажил (1)

- 3 Зерныго
 Внутрь сайн: чатырныс тууш үйдэ-эрхэс сайн гархыс бэ одоотайн сайнуурлуусан шалхын
 түгшнэй нүүр чатырнэй сайнуурлуусан шалхын түгшнэй харуулунэ.
 Сайнуурлуусан тууш: Одоо ашхалдэж буй сайнуурлуусан шалхын тууш
 Сайн болгох тууш: Нэгэнтэсэн халхыгтой медээгнэ бринэ, хөгэс кохсын халхыгтой
 медээгнэ
 4 Газар
 Зыгар тэстэй: УБ хотод ойрын ашхын газарт хэрэгжүүлнэ. Газрын сонгох ашиг
 хойдхэд байна.
 5 Аргачлал
 Сонгохон байрлалын FM10, FM2.5, SO₂ хэмжээнтэйг 3 дооно хоног хойш. Судалгын
 өмнө бэ дарах 1 сэрэг хуучинда одоо ашхалдэж буй түгшнэй хэмжээнтэйг мөн 3
 дооно хоног хойш.

2.6.1 Загвар төслийн сайжруулсан шатмал түлшний ашгарлын бууралтын үр дүнг баталгаажуулах ажил (2)

□ Сайжруулсан нэгжлэл түлш
Орц найрлага

Орц найрлага

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① Гэрлэн дохионы зохицуулалт

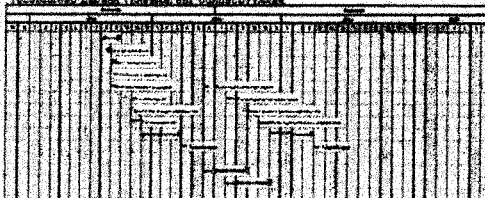


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2.6.2 Загвар төслийн сайжруулсан шахмат түлшний ялгарлын бууралтын үр дүнг баталгаажуулах ажил

ОГӨдөөлөгчөө

2021 оны 8 сард ЖАЙКА төслийн баг Монголд ирж боломжтой болно гэсэн
түгээлгөөр дэлгэх талархтгаа Золдосгуулаа



② Хүхэр багатай шатахуун



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ENVIRONMENTAL

2021 оны 8 сард жил туршиг дундажтай 2021 оны 9 сард хойш буюу тооцогдсон сайн дуурт өсөлтэй тусламж үйлчилгээний багцтай ажлыг үйлдвэрлэл, худалдаа, хэргийн гүйцэтгэлтэй болох үүрэгт 2021 оны 12 сард 2022 оны 1 сард хэрэгжүүлэх зарвар төслийг хэрэгжүүлэх боломжгүй болно. Энэ тооцогдсон зарвар төслийн төлөвлөгөөг бэлдснээр.

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③ РМ-ыг бууруулах тоноглол (DPF)



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- 19

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- 20

Abstract

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Анхаарал хандуулсанд баярлалаа


1.Б

**Монгол улс Улаанбаатар хотын Агаарын
бохирдлын хяналтын чадавхыг бэхжүүлэх төсөл
(3 дугаар үе шат)
ХЗХ-ны 5 дугаар хурал**

2021 оны 6 дугаар сар
ЖАЙКА төслийн баг

**3.Өнөөгийн тулгамдсан асуудал, ХЗХ-ны 5-р хурлаар хэлэлцэх зүйлс
3.1 ХЗХ-ны 4-р хурлаар хэлэлцсэн асуудлыг багатах (2)**

ХЗХ-ны 4-р хурлаар RSD-ийг хянуулах болон түүнтэй холбоотой хууль эрхзүйн орчинг бүрдүүлэх талаар хүсэлт тавьсан. RSD-ийг хянуулах талаар Үндэсний хөтөлбөрт тусгагдсан бөгөөд боломж хууль эрхзүйн байдал тодоройгүй. Иймд 2023 оны 5 сард RSD-ийг судалгаа туршигт хэрэгжүүлсэн ч Монгол тал болон арга хэмжээтэй холбоогддоггүй.	RSD-ийг загвар төслийг хэрэгжүүлсэн ч Монгол талын болон арга хэмжээтэй холбоогддоггүй учраас ЖАЙКА-ийн мөргөмжлөлийн баг, ЭТХХ, НТҮТ нь 2023 оны 4 сард багтаан RSD-ийг хянуулах тодорхойгүй. 2024 оны 7 сард багтаан RSD-ийг хууль эрхзүйн орчинг бүрдүүлэхийг хүсэлт тавьсан.
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ХЗХ-ны 5-р хурлын зорилго

- Гүйцэтгэлийн хийлэн (Дугаар 5-г батлах (У/а хамруулсан хугацаа: 2020-11-2021.04)
- Цаашид үст ажиглалтаагаа татгалзахыг батлах (Гүйцэтгэлийн хийлэн-5-д тусгасан)
- Өнөөгийн тулгамдсан асуудал, ХЗХ-ны 5-р хурлаар хэлэлцэх зүйлс
 - ХЗХ-ны 4-р хурлаар хэлэлцсэн асуудлыг нягтлах
 - Хэрэгжилттэй холбоотой хүсэлт
- Япон талын санхүүг Монгол талаас зөвшөөрөх асуудал
 - ТТМ-ийн үр дүнтэй шалгуур үзүүлэлтийн өөрчлөлт
 - ТТМ-д нэмэлтээр оруулах үйл ажиллагааны санал

**3.Өнөөгийн тулгамдсан асуудал, ХЗХ-ны 5-р хурлаар хэлэлцэх зүйлс
3.1 ХЗХ-ны 4-р хурлаар хэлэлцсэн асуудлыг багатах (3)**

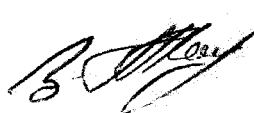
ХЗХ-ны 4-р хурлаар ЭТХХ-ийг хэрэгжүүлсний дараа УБ хотын нийт гэрэл дэлгэц хянуулахыг сайжруулах зорилгоор хэрэгжүүлсэн бөгөөд судалгаа туршигт бус байсан. Иймд 2023 оны 7 сард судалгаа ажиглалтаа татгалзах ч болон арга хэмжээтэй холбоогддоггүй.	Гэрэл дэлгэц хянуулахыг хэрэгжүүлсэн бөгөөд судалгаа туршигт бус байсан. Иймд 2023 оны 7 сард судалгаа ажиглалтаа татгалзах ч болон арга хэмжээтэй холбоогддоггүй.
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**3.Өнөөгийн тулгамдсан асуудал, ХЗХ-ны 5-р хурлаар хэлэлцэх зүйлс
3.1 ХЗХ-ны 4-р хурлаар хэлэлцсэн асуудлыг багатах (1)**

2021 оны 1 сарын ХЗХ-ны 4-р хурлаар Монгол, Япон талууд Сайжруулсан нийгэм түрүүлэх ажлын хэргийг 2021 оны 4 дүгээр сард багтаан байгуулахыг тодорхойлсон боловч ажлын хэргийг байгуулагдаагүй байна.	2021 оны 1 сард тодорхойлогдсон ажлын хэргийг 2021 оны 4 дүгээр сард багтаан байгуулахыг Япон тал Монгол талас хүсэлт тавьсан.
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3.1 ХЗХ-ны 4-р хурлаар хэлэлцсэн асуудлыг нягтлах (4)

2021 оны 1 сарын ХЗХ-ны хурлаар АББУХ-ны ажлын хэргийг 2021 оны 4 дүгээр сард багтаан байгуулахыг тодорхойлсон боловч ажлын хэргийг байгуулагдаагүй байна.	НМХГ, Экологийн цагдаагийн алба, мэргэжлийн улс сурталын алба, мэргэжлийн хянуулах асуудлыг Монгол тал ажлын байгуулалтын хүсэлт тавьсан. Япон мөргөмжлөлийн баг, ЭТХХ, НТҮТ нь 2023 оны 4 сард багтаан RSD-ийг хянуулах тодорхойгүй. 2024 оны 7 сард багтаан RSD-ийг хууль эрхзүйн орчинг бүрдүүлэхийг хүсэлт тавьсан.
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YAN SIKHONG 1-4-10
BANKING

Ушундан кийин 1-4-10
НАБТУ ж. ЖАЙКА-ны
Мурзакенттин дзонгхотун мух
Динбошорхутун АУСК-ни
хисабуна алаштырты. Иккинчи
жылдан кийин Мурзакенттин
губерния динбошорхутун болжолот
болгон.

Үр дүгийн шингүүр 1-2
НАЕГГ бием жибсдих
бейгуунига на халган у
тайланг 3-мэс досингүй у
бэлгэн НЭД-мэс ороогч
өгнө

Үр дүнгийн пиацгуур 1-2
НАВИГ бонор хамбогдох
байгууллага нь хамгийн утгаар
тайвны 3-ас доошгүй удаа
байгуул Агаарын бохирдлын
асуудал хариулсан төслүүдийн
үндсэн-нэг гаргах өгнө

Анхаарал тавьсанд баярлалаа

ХЗХ-ын 4-р хурлын үед НАБТГ-ын зүгээс ЖАЙКА-д хандж Дамбыдэвжлэгийн АЧЗХ-ын хэмжээний өгөгдлийг ягаар орны мониторингийнг сүлжээнд холбоход дэмжжээ үзүүлэнгүй хүссэн. Тухайн нөлцөн байдалтай танинхж, ягаар орны мониторингийнг сүлжээнд хэмжээний өгөгдлийг дэмжүүлж талгаар судалж зүүг ягаард талгай байгаа учраас ойлголцаар холбоодод зохилцуулж лэйнэ.

B. B.
I.B.



ANNEX III PDM (ver. 1.4)

Project Design Matrix (PDM)

Ver.1.4

Dated: June 24, 2021

Project Title: Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3

Implementing Agency: Air Pollution Reduction Department (DAAP) of Ulaanbaatar (UB) City, Ministry of Environment and Tourism (MET) and Counterpart Working Group (C/P-WG)

Target Group: DAAP, MET, C/P-WG and Relevant Agencies

Duration of the Project: November 2018 – July 2024 (5 years and 9 months)

Project Site: UB City

Overall Goal		1. XX% of emissions from major pollution sources is reduced compared with the BAU baseline.		1. Comparison between BAU and updated inventory for target year (3 to 5 years after completion of the Project)	
Emission reduction at major emission sources is enhanced towards air quality improvement in Ulaanbaatar City.					
Project Purpose Capacity for air pollution control in Ulaanbaatar City is strengthened, paying special attentions to implementation of effective pollution control measures and to the necessary coordinating mechanism of DAAP and the relevant agencies.		1. XX of pilot projects are adopted as full scale implementation by relevant authorities. 2. XX cases of lessons learned from the pilot projects are utilized by the decision makers. 3. Relevant laws, regulations and standards on air pollution control measures are implemented in UB City, (such as XX of newly established MNS standards, XX% of achievements of existing MNS emission standards)		1. The Project reports 2. Interview survey to the relevant agencies 3. Laws, regulations, MNS standards, and ordinances of UB City	
Outputs					
Output 1: Capabilities of emission monitoring for the major pollution sources and of air quality monitoring are strengthened.		1-1. During the Project duration, at least 50 % of inspections for boiler registration based on emission measurements (including standard and simplified methodologies) are implemented by DAAP and IACC. 1-2. The emission measurement reports are submitted to the Project Leader of UB City in Charge of Air and Environmental Pollution at least 3 times during the Project duration. 1-3. Emission monitoring for the major pollution sources and air quality monitoring information are shared regularly among the relevant agencies through coordination between DAAP and NAMEM. 1-4. The CEMS measurement is compared with the standard measurement once in a year. 1-5. Distribution of emission measurements from vehicles in UB City is prepared based on the study with RSD at least once a year. 2-1. The results of PM apportionment study are reported at least three times during the Project. 2-2. Pollution structures are assessed at least 3 times during the Project duration including emission inventory, simulation model, PM specification, receptor model, air quality monitoring and population exposure throughout the year. 3-1. Drafts of emission measurement methods and quality standards of improved fuel for households in Ger area are submitted to MASM. 3-2. At least three of implementation plans of the pilot projects are prepared.		1. Emission measurement reports by DAAP / IACC 2. The Project reports 3. Boiler registration database 4. Air quality monitoring monthly reports and annual reports 5. CEMS data	
Output 2: Capabilities to analyze and evaluate pollution structure of PM, SO ₂ , and NO _x throughout the year are strengthened.				1. The Project reports	
Output 3: Capabilities of technical evaluation and preparation of air pollution control measures for implementation are strengthened.				1. The Project reports	
Output 4: Decision making process for air pollution control is improved by utilizing the Professional agencies including DAAP, NAMEM and the relevant agencies.		4-1. Analysis of air pollution status, short-, medium- and long-term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned) are presented to decision makers at least 2 times. 4-2. Results of pilot project implementation and other Project results are utilized for the revision of NCEPR and for decision making on implementation/non-implementation of pollution control measures at least once.		1. The Project reports 2. Reports on NPREP	
				1. Legal and political framework for air quality management is maintained, which defines decision making mechanism such as NCEPR and professional agencies like DAAP and NAMEM. 2. The COVID-19 pandemic situation will be improved and JICA will be able to send JICA Experts to Mongolia toward April 2021 until the end of the Project.	

Output 5: Air pollution control measures are enhanced for PM, SO ₂ and NO _x emission reduction at major sources.	5-1. At least three pilot projects selected by C/P-WG are implemented 5-2. The results of each pilot project (emission reduction, improvement of ambient air quality and population exposure for PM, SO ₂ and NO _x) are presented to the relevant agencies.	1. The Project reports	
Output 6: Legal framework, resource allocation and coordinating mechanism as a Platform for the Air Quality Management Cycle are strengthened for the Outputs 1 to 5.	6-1. At least three of drafts on laws and regulations, such as fuel regulations, MNS emission standards and ordinances of UB City, are submitted. 6-2. More than 3 air pollution control measures and technologies are funded by the sections of the relevant agencies in charge of allocating funds for air pollution control by utilizing technical appraisal guideline provided by the Project. 6-3. At least three agreements are made on demarcation of roles of the relevant agencies for air pollution control measures in the Project. 6-4. The operational guideline is distributed to relevant agencies.	1. Laws and regulations, fuel regulations, MNS emission standards and ordinances of UB City 2. Minutes of Meeting of NCEPR 3. Official documents including UB city Governor's orders 4. Operational guideline	
1-1 DAAP and IACC reinforce HOB inspections based on on-site stack gas measurements. 1-1-1 DAAP and JICA Experts assess the technical transfer on-site stack gas measurement. 1-1-2 DAAP with JICA Experts re-constructs 2 teams of stack gas measurement. 1-1-3 IACC and the relevant agencies with JICA Experts implement HOB inspection based on on-site stack gas measurement. 1-1-4 IACC with JICA Experts introduces simplified measurement method by using IACC's portable gas measurement equipment including parallel measurement with JIS method, elaboration of manuals and manufacturer's calibration. 1-1-5 DAAP and IACC with JICA Experts elaborate emission measurement reports. 1-2 TPP3 and TPP4 with JICA Experts enhance emission gas control by utilizing CEMS. 1-2-1 TPP3 and TPP4 with JICA Experts elaborate and implement CEMS operation and maintenance plan. 1-2-2 TPP3 and TPP4 with JICA Experts perform quality control of emission gas data of CEMS. 1-2-3 TPP3 with MET and the relevant agencies elaborates online emission data reporting system for the CEMS. 1-2-4 NAMEM and the relevant agencies share and evaluate CEMS emission data. 1-2-5 NAMEM compiles monitoring data of emissions from TPP2, TPP3, TPP4 and new large heat supply facilities and share them with relevant agencies. 1-3 MRTD and PTSD introduce relevant regulations of vehicles based on emission measurement. 1-3-1 MRTD and PTSD with JICA Experts implement vehicle emission measurements by RSD, assess distribution of vehicles emission intensity and define target vehicles to be regulated. 1-3-2 MRPA and IACC with JICA Experts implement automobile fuel surveys. 1-3-3 JICA Experts conduct training to NRTC, in addition to DAAP, on vehicle emission measurement using on-board emission measurement system, and DAAP and NRTC implement vehicle emission measurement using on-board emission measurement system. 1-4 DAAP and NAMEM with JICA Experts strengthen AQMS utilization. 1-4-1 CLEM and JICA Experts assess the current status of equipment in reference laboratory of CLEM and identify necessary actions if necessary. 1-4-2 DAAP reinforces AQMS operation and maintenance based on the plan by Phase 2. 1-4-3 DAAP with JICA Experts starts air quality monitoring at pilot project area for improved household fuels by utilizing mobile AQMS. 1-4-4 DAAP with JICA Experts reinforces the AQMS at Bayankhoshuu station. 1-4-5 DAAP and NAMEM with JICA Experts implement parallel measurement by EPA sampler for PM concentration, and implement quality control of PM measurements of AQMS. 1-4-6 DAAP and NAMEM with JICA Experts maintain the online information system of AQMS. 1-4-7 DAAP and NAMEM share real-time monitoring data with the relevant agencies through the online information system. 1-4-8 DAAP and CLEM with JICA Experts analyze air quality monitoring data and elaborate air quality monitoring reports. 1-4-9 The relevant agencies utilize air quality monitoring data. 1-4-10 DAAP with JICA Experts establishes the data transfer system of air quality monitoring data of Dambadarjaa station to the online information system of AQMS.	Japanese side 1. JICA experts (necessary fields) (1) Chief Advisor (2) Air Pollution Control Planning and Policy (3) Emission Measurement for Stationary Sources (4) Ambient Air Quality Monitoring (5) Ambient Air Quality Analysis (6) PM10 and PM2.5 (7) Sampling (8) Apportionment Study (9) Emission Inventory (Stationary, Mobile and Others) (10) Air Quality Simulation Modeling / Air Pollution Control Measures Evaluation (11) Auto-mobile Emission Control (12) Clean Coal Technology for Air Pollution Control Measures (13) CEMS Data Analysis (14) Stationary Source Emission Control (15) Air Quality Administration (16) Public Awareness and Public Relations Mongolian side 1. C/P and C/P-WG (1) JCC Chairperson (2) JCC Vice-Chairperson (3) Project Director (4) Project Manager (5) Necessary C/P and C/P-WG staff according to the fields of JICA Experts 2. Facility (1) Provision of necessary office space in DAAP and MET (including internet access) (2) CLEM Laboratory (3) Storage Space for Equipment 3. Local cost (1) Counterpart expenses such as salary, allowance, travel cost and accommodation (2) Project administrative expenses	1. There are no frequent leaves, transfers or resignations of C/P and C/P-WG members. 2. Necessary coordination among UB city, districts, khoroos and communities in Ger area is secured by Mongolian side for implementation of pilot projects.	

2-1 NAMEM and JICA Experts conduct PM apportionment study based on PM speciation throughout the year. 2-1-1 CLEM and JICA Experts elaborate PM sampling plan throughout the year, and implement PM samplings. 2-1-2 JICA Experts perform PM speciation analysis in Japan. 2-1-3 NAMEM and CLEM with JICA Experts learn PM speciation technologies (ion analysis, element analysis and carbon analysis). 2-1-4 NAMEM and CLEM with JICA Experts formulate equipment and laboratory plan for PM speciation. 2-1-5 DAAP and NAMEM with JICA Experts perform PM apportionment study based on receptor modeling. 2-2 DAAP and NAMEM with JICA Experts evaluate air pollution structure and health impact based on air quality simulation model and receptor model. 2-2-1 DAAP and NAMEM elaborate plans for updating emission inventory. 2-2-2 DAAP, TCC and PTSD implement studies for mobile sources including update of emission inventory, examination of traffic signal control, traffic volume and vehicle traveling speed. 2-2-3 DAAP and JICA Experts select the pilot areas and assess Ger stoves usage pattern (type and model of stoves, seasonal pattern of usage, insulation of Ger housing and coal consumption). 2-2-4 DAAP and NAMEM with JICA Experts implement studies for other emission sources as necessary. 2-2-5 DAAP and NAMEM with JICA Experts elaborate BAU (Business as usual) scenario for the future year based on TPPs future development plans, projection of number of vehicle, population, economic growth, emission regulation, fuel quality regulation and so on. 2-2-6 DAAP and NAMEM update emission inventory for the present year and the future year for the BAU scenario. 2-2-7 DAAP and NAMEM update the air quality simulation model for PM10, SO₂ and NO_x. 2-2-8 DAAP and NAMEM evaluate the air pollution structure of UB city. 2-2-9 DAAP and NAMEM evaluate indicative population exposure of PM10 based on population weighted concentration and so on.	2. Training seminars and workshops (1) Local workshops (2) Training course in Japan 3. Provision of necessary equipment 4. Local cost Necessary expenses for activity of JICA Experts	Pre-conditions 1. Appropriate number of qualified staff of C/P and C/P-WG is assigned. 2. Adequate amount of budget related with the Project
3-1 DAAP and the relevant agencies elaborate a draft MNS on an emission measurement method of improved fuel and fuel quality, and propose it to MASM. 3-2 ME with JICA Experts elaborates safety standards on the household gas distribution. 3-3 DAAP and the relevant agencies elaborate implementation plans and terms of reference for pilot projects such as improved fuel, HOB, traffic signal control, eco-driving, RSD, smoke belching program based on portable emission device, DPF, low sulfur fuel and low emission vehicles. 4-1 DAAP and NAMEM submit to the decision makers the analysis of air pollution status, short-, medium- and long-term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned). 4-2 Relevant agencies with pilot projects elaborate technical guidelines and utilizes them. 4-3 The relevant agencies discuss and endorse the selection of pilot projects. 4-4 NCEPR and the relevant agencies approve large scale investments based on pilot projects implementation and assessment. 4-5 NCEPR, or the sections of the relevant agencies in charge of allocating funds for air pollution control in the Mongolian government such as the Environment and Climate Fund utilizes the Outputs of the Projects and pilot projects implementation and assessment. 5-1 DAAP with Health Department of Capital City and the relevant agencies implements public awareness and advisory activities for citizens including school students and parents. 5-2 MET and DAAP publish progress of the Project by newsletter, newspaper articles, web-site and other medias. 5-3 DAAP and JICA Experts provide technical guidance to manufacturers for improved fuel production. 5-4 The relevant agencies with JICA Experts implement pilot projects according to the implementation plan by Activity 3-3. 5-5 The relevant agencies with JICA Experts evaluate pilot projects results in terms of emission reduction, air quality improvement and exposure to citizens, and extract lessons learned. 5-6 The relevant agencies with JICA Experts report the pilot projects results to NCEPR. 5-7 TPP3 and TPP4 analyze CEMS data, and examine viable air pollution control measures. 5-8 TPP3 and TPP4 with JICA Experts elaborate emission reduction plans.		

6-1 The relevant agencies discuss and elaborate written agreements on demarcation of roles in air quality management related with each Output and Activity of the Project. 6-2 DAAP with JICA Experts submits technical documents to NCEPR for improved fuel standard, emission standard on stationary sources, mobile sources and other emission sources, and revision of ordinance. 6-3 NCEPR and the relevant agencies elaborate fuel standard and emission standard, and submit them to MASM. 6-4 Relevant ministries / relevant agencies of UB city elaborate laws, regulations and ordinances on air pollution control measures, and submit them to national parliament / city council. 6-5 JICA Experts provide training on air pollution control measures and technical appraisal guidelines for staff of the sections of the relevant agencies in charge of allocating funds for air pollution control. 6-6 Staff of the sections of the relevant agencies in charge of allocating funds for air pollution control with JICA Experts improve relevant operations with allocating funds for air pollution control measures, if necessary. 6-7 Mongolian side enhances donor coordination in air pollution control. 6-8 Relevant agencies of pilot projects with JICA Experts develop an operational guideline for elaboration, implementation and evaluation of air pollution control measures based on pilot projects implementation.	Implementation is secured. 3. Necessary human resources mobilization related with pilot projects is secured by Mongolian side.
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AQMS: Air Quality Monitoring Station
BAU: Business as Usual
CEMS: Continuous Emission Monitoring System
CFWH: Coal Fired Water Heater
C/P: Counterpart
C/P-WG: Counterpart Working Group
DAAP: Department of Against Air Pollution of Capital City
DPF: Diesel Particulate Filter
FRM: Federal Reference Method
HOB: Heat Only Boiler
IACC: Inspection Agency of the Capital City
MASM: Mongolian Agency for Standardization and Metrology
MET: Ministry of Environment and Tourism
MMHI: Ministry of Mining and Heavy Industry
MNS: Mongolian National Standard
MRPA: Mineral Resources and Petroleum Authority
MRTD: Ministry of Road and Transport Development
NAMEM: National Agency for Meteorology and Environment Monitoring
NCEPR: National Committee for Environment Pollution Reduction
NPREP: National Program on Reducing Environment Pollution
NRTC: National Road Transport Center
PTSD: Public Transportation Service Department of the Capital City
PM: Particulate Matter
RSD: Remote Sensing Device
TCC: Traffic Control Center of the Capital City
TPP: Thermal Power Plant

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MINUTES OF MEETING OF
THE SIXTH JOINT COORDINATING COMMITTEE MEETING
ON JAPANESE TECHNICAL COOPERATION FOR
CAPACITY DEVELOPMENT PROJECT FOR AIR POLLUTION CONTROL IN
ULAANBAATAR CITY PHASE 3 in MONGOLIA

The Japan International Cooperation Agency (hereinafter referred to as "JICA") Supervisory Team for "Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3 in Mongolia (hereinafter referred to as "the Project")", JICA Mongolia Office, and JICA Expert Team (hereinafter referred to as "JET") had a series of meetings with Department of Against Air Pollution of Capital City (hereinafter referred to as "DAAP"), Ministry of Environment and Tourism (hereinafter referred to as "MET") and Joint Coordinating Committee (hereinafter referred to as "JCC") members from 4th November to 9th December 2021 to discuss the Progress Report 3, Monitoring Sheet No.6, and held the fifth Counterpart Working Group (hereinafter referred to as "C/P-WG") meeting in online video format on 6th December and the sixth JCC meeting of the Project chaired by Mr. Ikhubayar Dashnyam, Project Leader of Capital City in charge of air and environmental pollution in hybrid format on 9th December 2021. Participants list of the sixth JCC meeting is shown in Annex I.

Japanese side and the Mongolian authorities had a series of discussions. As a result of discussions, both sides agreed on matters referred to the document attached hereto.

The parties acknowledge and agree that this Minutes of Meetings may be executed by electronic signature, which is considered as an original signature for all purposes and has the same force and effect as an original signature. "Electronic signature" includes faxed versions of an original signature or electronically scanned and transmitted versions (e.g., via pdf) of an original signature.

Tokyo and Ulaanbaatar, 27th December 2021

田村 恵子

Ms. Eriko TAMURA
Leader, JICA Supervisory Team,
Chief Representative
JICA Mongolia Office
Japan International Cooperation Agency,
Japan

Mr. Ikhubayar DASHNYAM
Project Leader of Capital City in
Charge of Air and Environmental
Pollution, Mongolia

田畑 亨

Mr. Toru TABATA
Leader, JICA Expert Team, Japan

Mr. Enkhmunkh GANBOLD
Director General
Environment and Natural Resources
Management Department, Ministry of
Environment and Tourism, Mongolia

Mr. Batkhuu IDESH
Director General
Development Financing
Department
Ministry of Finance, Mongolia

ATTACHED DOCUMENT

I. Progress Report 3 and the Project Monitoring Sheet 6

JET explained the progress of the Project, future activity plan, and issues that the Project is facing since its beginning. After active discussions, the JCC approved the Progress Report 3 and the Project Monitoring Sheet 6.

Revision of the Project Design Matrix (II to III)

II. Revision of the Project Design Matrix (Objectively Verifiable Indicators)

The Japanese side proposed the revision of the Project Design Matrix (hereinafter referred to as PDM), which was approved by the Mongolian side. The revised contents in the PDM are indicated in Annex II.

1. Objectively Verifiable Indicators 1

“1. XX of pilot projects are adopted as full scale implementation by relevant authorities.” will be replaced by;

“1. One of pilot projects is adopted as full scale implementation by relevant authorities.”

2. Objectively Verifiable Indicators 2

“2. XX cases of lessons learned from the pilot projects are utilized by the decision makers.” will be replaced by;

“2. At least one case of lessons learned from the pilot projects are utilized by the decision makers.”

3. Objectively Verifiable Indicators 3

“3. Relevant laws, regulations and standards on air pollution control measures are implemented in UB City. (Such as XX of newly established Mongolian National Standard (hereinafter referred to as “MNS”) standards. XX% of achievements of existing MNS emission standards)”

will be replaced by;

“3. Relevant laws, regulations and standards on air pollution control measures are implemented in UB City (At least establishment of one MNS, and/or 70% of compliance in the dust emission standards of existing MNS; MNS5043:2016 (General technical requirement of heat water boiler under 4.2MW) and MNS5919:2008 (Emission limit value and measurement method of power plant, steam boiler).)”

III. Additional Activity of PDM

Diesel Particulate Filters (hereinafter referred to as “DPFs”) have been installed in 24 large buses under the project “Verification Survey with the Private Sector for Disseminating Japanese Technologies for Emission Reduction of Particulate Matter



(hereinafter referred to as "PM") from Diesel Buses by DPF". The DPF equipment has been handed over to the relevant organizations of the UB city. The buses with DPFs will retire in December 2022 as they are more than 12 years old. At the 5th JCC, the Mongolian side requested the Japanese side to provide "technical support regarding the relocation of DPF" in the project. After confirming the current situation, the Japanese side decided to support the activities to transfer DPFs installed in 24 large buses to other buses. The Japanese side proposed to add the following activity 1-3-4, and the Mongolian side agreed.

"1-3-4 Public Transportation Service Department of the Capital City (hereinafter referred to as "PTSD") with JICA Expert transfer the DPFs which were installed on 24 large buses by the project "Verification Survey with the Private Sector for Disseminating Japanese Technologies for Emission Reduction of PM from Diesel Buses by DPF" to other buses.

IV. Request from the Japanese side of the issues on the future project activities

1. Agreement on the role sharing in developing emission inventories, implementing simulation models, and assessing air pollution control measures

The roles of DAAP, National Agency for Meteorology and Environment Monitoring (hereinafter referred to as "NAMEM"), and Information and Research Institute of Meteorology, Hydrology and Environment (hereinafter referred to as "IRIMHE") have not been defined in developing emission inventories, implementing simulation models, and assessing air pollution control measures. It is important that these organizations will continue the tasks in their official business. Therefore, the Japanese side requested to issue the agreement on the role sharing in developing emission inventories, implementing simulation models, and assessing air pollution control measures.

Mr. Batbayar JADAMBA of NAMEM agreed this request, stating that they will issue the joint agreement to clarify their roles and to promote the activities on simulation modeling and evaluation of the measures. Ms. Tsolmon TSOGBADRAKH of DAAP also agreed that.

2. Installation of the crusher

The crusher, which was provided by the Project to Ministry of Energy (hereinafter referred to as "ME"), then leased by Tavan Tolgoi Tulsh LLC (hereinafter referred to as "TTT") has not been installed. The Japanese side requested that TTT should install the crusher by April 2022. JET, DAAP, and TTT discussed the matter, and then TTT has completed the installation of the crusher in December 2021 according to the Japanese request.

V. Request based on the 4th and 5th JCC

1. Establishment of working group of improved fuel

The Mongolian side and the Japanese side agreed in the 4th JCC in January 2020 to



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establish the working group by April 2021, which has not yet been realized. Director of Fuel Policy Implementation and Coordination Department of ME will confirm the requests in the official letter, and will consider to establish the working group. JET requested to establish the working group by May 2022, in which the proposal of technically improved fuel, report of the pilot project, cost-effectiveness of improved fuel will be discussed.

Ms. Tsolmon TSOGBADRAKH and Ms. Purevsuren BOLOOJ of DAAP mentioned that DAAP had sent several letters and communications from DAAP to the ME requesting the establishment of a working group based on the request from the Japanese side at the 4th JCC. DAAP requested ME and Ministry of Environment and Tourism (hereinafter referred to as "MET") to accelerate the establishment of the working group, as it was requested again at this JCC.

Ms. Davaasuren DAMDIN, attended on behalf of the director of ME responded that the establishment of the working group was delayed due to the timing of the organizational change of the ME, and that it would be discussed within the ME. In addition, she stated that it is necessary for the Japanese and Mongolian sides to decide the level at which the working group will be established, whether it will be at the level where the central government will be involved and manage the project, or at the level where the results of the pilot project will be verified. She also stated that ME and TTT would like to discuss the roles of ministries and the private sector, and then consider what kind of policy to pursue in the future.

Mr. Munkhbat TSENDEEKHUU of MET mentioned that the working group would be an opportunity for the relevant organizations to discuss the progress, results, and effects of the pilot project, and that MET could accept the establishment of the working group.

2. Pilot project for improved fuel

JET proposed to the Mongolian side that:

- 1) Assuming that the JICA experts in charge will resume their travel to Mongolia in April 2022, TTT, JET and DAAP will discuss and prepare for the pilot project as follows;
 - A) TTT will make arrangements for JET to purchase 7.2 tons of existing TTT's improved fuel.
 - B) JET will prepare mixtures of biomass, semi-coke, etc., desulfurizers and binders, and TTT will prepare 8 tons of UHG middling.
 - C) JET will support TTT to produce 100 kg of sample fuels and 7.2 tons of improved fuels for the pilot project.

JET, TTT, and DAAP have discussed and TTT agreed to support providing UHG middling and producing fuel for the pilot project. The three parties will continue to discuss the details of the cooperation.



3. Installation of Remote Sensing Device (hereinafter referred to as "RSD") and preparation of the legal framework for RSD utilization

The cost for installation of RSD is included in the budget for construction of a new road between UB city and Darkhan city. However, the Mongolian side is now looking for funding for the construction. In addition, the Ministry of Road and Transport Development (hereinafter referred to as "MRTD") has submitted to the Parliament the revised version of the Road Transport Act including usage of the latest technology to improve the vehicle control system. The revised act contains the specification of the system and the necessary legal arrangement will be initiated in the future. The Japanese side proposed to the Mongolian side that specific regulations, penalties, and maintenance orders should be considered for the implementation of the regulations, and that the legal system including ordinances should be developed by May 2024, in order for the RSD pilot project to be developed as a full-scale project.

No objection was raised by the Mongolian side on this point. The Japanese side will continue to make this request and promote the Mongolian side's actions.

VI. Progress of the request regarding issues and obstacles for scaling up the pilot projects to the full-scale projects

1. Sales of low-sulfur fuel

The Ministry of Mineral and Heavy Industries (hereinafter referred to as "MMHI") is submitting a bill to the MET to revise the Air Law in order to stipulate the sales of EURO 5 fuel in the Air Quality Improvement Area. In addition, MMHI has submitted a bill to the Ministry of Finance to eliminate the price difference between existing fuels and EURO5 fuel by taxation in order to promote the sale of low-sulfur fuels. The efforts by the Mongolian side and progress toward a full-scale project were confirmed.

2. Installation of PM reduction equipment (DPF) and low emission vehicles

The PTSD requested the technical support from the Project to transfer DPFs of 24 buses that had been installed by another JICA project regarding DPF Verification Survey, since those buses would retire.

There is a target of using Compressed Natural Gas (hereinafter referred to as "CNG") and electric vehicles for public buses. The target is replacement of 590 buses to CNG or electric buses, and 35 buses out of planned 100 buses were purchased. It was confirmed that the full-scale project regarding low emission vehicles had proceeded. Although there is no plan to install additional PM reduction equipment, Ms. Tsolmon of DAAP has welcomed that the newly-added activity on transfer of DPF on 24 public buses, stating that they would like to expedite the activity cooperating with the PTSD, since the PM emission reduction by DPF is estimated as 70 to 80 %.

3. Introduction of the equipment for operational management for promotion of eco-



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driving and development of legal arrangement

MRTD has an activity to improve the road safety, but there is no plan to install operation management devices, or to develop a law to obligate to install them. On the other hand, funding for the operation management devices is secured in the budget of the governor of the capital city in the framework for mitigation of traffic congestion. It was confirmed that the preparation for the pilot project and full-scale project by the Mongolian side was progressing.

VII. Other Issue

Ms. Davaasuren DAMDIN of ME mentioned that the simulation model for year 2020 is planned to be developed by next June, but she asked for the work to be carried out ahead of the schedule in order to clarify the effect of emissions reduction as soon as possible.

Ms. Purevsuren BOLOOJ of DAAP responded that it is taking much time due to changes in organizational structure and personnel, and a lack of support from relevant ministries and agencies on the Mongolian side. It is important to understand the emissions in 2020, and the activity plan is prioritized for 2020 over 2019. However, she mentioned it would take the time to arrange the data because it also needs to be carefully examined, after which diffusion simulation modeling will be carried out.

Mr. Munkhbat TSENDEEKHUU of MET mentioned that the registration information for emission sources using raw coal has been provided, and simulation calculations are able to be proceed as planned, but he requested the Project to provide the emission inventory on 2020 until January 2022 even as a draft basis.

JET responded that the preparation of the emission inventory on 2020 should be led by the Mongolian side, but issuance of the inventory report is scheduled by the end of January 2022.

VIII. Opening remarks by Mr. Ikhbayar Dashnyam Project Leader of Capital City in Charge of Air and Environmental Pollution

It has been two weeks since I was appointed as the Project Leader. I am currently in the midst of a very busy period of budget discussions in UB City. As a former deputy mayor of UB City in charge of innovation and technology, I have been involved in various activities related to air pollution and environmental issues, so I am somewhat familiar with this field. The Mongolian side appreciates JICA's cooperation with the Mongolian government to implement various projects in various fields. By implementing the Project in cooperation with JICA, the Mongolian side has been able to manage air quality in the air quality improvement areas of UB. It has enabled us to plan where Mongolia is now and where Mongolia want to go in the future. I would also like to thank JICA for their cooperation in transferring technology to the UB city officers and setting up the laboratory. The Mongolian and the Japanese side have gathered here today to discuss the future action plan and the progress report so

far, and to discuss what both side should do in the future to reduce air pollution by 70, 80 to 90%.

IX. Opening remarks by Ms. Eriko TAMURA, Chief Representative of JICA Mongolia Office

Since the project has started in December 2018, it has been already three years. Despite various limitations due to the pandemic, JICA appreciates the efforts of various stakeholders in all activities to work together to properly verify the effectiveness of air pollution control implementation. Due to the impact of the COVID-19, the JICA expert team was unable to travel for a longer period than expected, which affected the implementation of the Project activities. The short-term experts resumed their travel this November and the Japanese side are now ensuring the progress of the results. Today's 6th JCC aims to clarify the achievements and challenges of the past activities, and to review future activity plans and other issues that both the Mongolian and Japanese sides need to address in order to achieve the Project goals. In particular, Project Leader has been changed so briefings from Project team about the project will be helpful for both sides to have same understanding. The implementation of the various pilot projects has been delayed therefore related evaluation and analysis have not been carried out yet. The Project activities have been postponed overall. At today's meeting, I would like to ask JCC members to discuss a more specific plan so that each pilot project will be connected as a full-scale project on the Mongolian side. Through the pilot project, I hope that both sides will be able to discuss how to tackle specific regulations, such as the sale of low-sulfur fuel, vehicle emissions, and mandatory installation of DPFs. It is suggestable for JCC members to discuss about smoother implementation of project considering the possibility that JET next travel might be restricted due to pandemic impact.

X. Conclusions by Mr. Taizo YAMADA, JICA Supervisory Team

I have been participating in this project since the Phase 1 preliminary study in 2008. In the Project Phase 1 and 2, JICA provided supports to the CP and CP-WG organizations in the technical transfer, human resource development, and strengthening of inter-organizational collaboration necessary to deal with air pollution in UB. The Project Phase 3 is aimed at strengthening the capacity to implement air pollution control measures. It is important for higher level decision-makers to be able to make technically rational decisions through the technical contributions of the professional agencies. JICA is very pleased to see that various efforts of the Mongolian side, such as the improved household fuel distribution project in the Ger area and the low-sulfur fuel pricing policy, are being implemented self-reliantly. In order for the further reduction of emission and the improvement of air quality, this Project phase 3 aims to implement pilot projects for



air pollution control, which will be developed into full-scale projects by the Mongolian side during the remaining period of the Project phase 3. The Japanese side has made various proposals to promote cooperation among the organizations for that purpose. I would like to express my gratitude to the Mongolian government for the joint agreement on the implementation of the simulation model, and for their positive consideration of the establishment of a working group on the pilot project for improved fuels for Ger area. Although the Project Phase 3 is trying to provide supports for advanced level, the Japanese side would like to ask the Mongolian side to take measures to ensure the availability of personnel and to take over the work for vehicle emission measurement, etc., at the field level. I am concerned that the technical transfers conducted in the past may not be utilized due to the shortage of personnel and succession problems. I hope that small problems at the field level should not become a major obstacle for the entire project. Although there are still various major obstacles to the implementation of the project due to COVID-19, I understand that the Project is making a progress steadily. The capacity of the Mongolian people has been advanced, and I am looking forward to seeing their future activities. I hope that the Mongolian and Japanese sides will work together in order to bring back the blue sky to UB City.

XI. Conclusions by Mr. Ikhbayar Dashnyam Project Leader of Capital City in Charge of Air and Environmental Pollution

Starting next year, UB City wants to implement not only improved fuel but also other measures at the policy level. 3,500 households, for example, will be re-located to apartments and 3,500 chimneys will be eliminated. 600 new public transportation buses will be purchased. Of these, 540 will be electric buses and 60 will be EURO5 buses.

In accordance with Decision No. 123 dated October 8, 2020 of the Deputy Prime Minister of Mongolia (Transfer of hot water and steam boilers to advanced technology), a total of 150 HOBs (80 HOBs using middling and 70 HOBs using raw coal) will be eliminated by 15th May, 2022. The Mongolian side is planning to implement a campaign to eliminate chimneys from the city in cooperation with each khoroo. In addition to improved fuel, the Mongolian side will try to discuss and implement other efficient measures. To drive car in UB, it is required to pay an air pollution fee every year, but the tax amount is very low compared to other countries, so it is necessary to consider increasing the tax at the central government level in the future. Another factor delaying the achievement of the goal is the increase in the emission sources of air pollution due to the urbanization. Migration from rural areas to UB City has led to an increase of 20,000 households per year in the Ger area. In addition, the number of vehicles is increasing by 50,000 per year. Expansion of the Air Quality Improvement Area is under consideration. It is planned to expand the air quality improvement area to include the surrounding areas of UB City and Nalaikh District from next year. It will take some time before significant results can be obtained at further level, but it is important that the ministry and UB city



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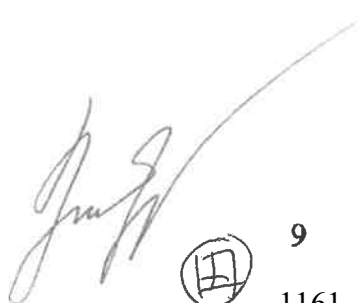
agencies work together to step up and achieve the results.

END

ANNEX I Participants of Sixth Joint Coordination Committee

ANNEX II Presentation of Progress Report 3 and Monitoring Sheet No.6, Revised
Activity Plan and Important Issue

ANNEX III PDM (ver. 1.5)



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ANNEX I Participants of Sixth Joint Coordination Committee

	Name	Organization	Position
1	Ikhbayar Dashnyam	Ulaanbaatar City	Project Leader of Capital City
2	D. Davaabayar	Ministry of Mining and Heavy Industry, Fuel Policy Department	Officer
3	Tulga	Ministry of Road and Transport Development, Information Technology Standards Department Information Technology Standard Division	Head of Division
4	Baysgalan	Ministry of Road and Transport Development, Policy and Planning Department Air Pollution Reducing and Green Development Division	Officer
5	D. Davaadsuren	Ministry of Energy Fuel Policy Implementation and Coordination Department	Surrogate
6	D.Bolormaa	Ministry of Construction and Urban Development, division of Policy and Planning	Officer
7	Ts.Munkhbat	Ministry of Environment and Tourism, Mongolia	Officer
8	Gerelmaa	Ministry of Finance Development Financing Department	Officer
9	A.Achibold	Ministry of Finance Development Financing Department	Officer
10	J. Batbayar	National Agency for Meteorology and Environment Monitoring Environment Monitoring Division	Head of Division
11	Munkhbold	Mayor's office Development Policy Planning Department	Head of Division
12	Nyamdorj	Public Transport Service Department	Officer
13	Battsooj	Public Transport Service Department	Officer
14	Enkhtur	Traffic Planning, Coordination and Engineering Department of Capital City	Head of Department
15	Unurjargal	Traffic Planning, Coordination and Engineering Department of Capital City	Officer
16	N.Bilegsaikhan	Urban Regulation, Environmental Safety Control Coordination Department Environmental Safety Control Division	Head of Division
17	D.Nomin	Urban Regulation, Environmental Safety Control Coordination Department Environmental Safety Control Division	Officer
18	D. Prevsuren	Department of Against Air Pollution of the Capital City	Acting Head of DAAP
19	T. Tsolmon	Department of Against Air Pollution of the Capital City	Acting Deputy Head of DAAP
20	Davaajargal	Department of Against Air Pollution of the Capital City, Division of Air Quality Management	Head of Division
21	G. Amartuvshin	Thermal Power Plan-3, Technical policy Division	Head of division
22	Taizo YAMADA	JICA Headquarter JICA Supervisory Team	Senior Technical Advisor (Environment)

23	Itaru CHIBA	JICA Global Environment Department Environmental Management Group Environmental Management Team 1 JICA Supervisory Team	Deputy Director
24	Eriko Tamura	JICA Mongolia Office	Chief Representative
25	Atsuki TAKEDA	JICA Mongolia Office	Project Formulation Advisor
26	Ch. MUNKHMANLAI	JICA Mongolia Office	National Staff
27	Toru TABATA	JICA Expert Team	Chief Advisor
28	Natsuji SAWAKI	JICA Expert Team	Sub Leader
29	Ei Edo	JICA Expert Team	Chief Sub Group Leader
30	Hajime Endo	JICA Expert Team	Clean Coal Technology / Pilot Project for Improved Fuel 1
31	Jun OKABE	JICA Expert Team	Auto-mobile Emission Control 2/ Emission Measurement for Mobile Sources
32	Shinya NAKATA	JICA Expert Team	Air Quality Simulation Model / Air Pollution Control Measures Evaluation / Emission Inventory
33	Satoshi MATOBA	Embassy of Japan in Mongolia	Secretary
34	M. BOLDBAYAR	Tavan Tolgoi Tulsh LLC	Director of Factory Department
35	Kh. Galiimbek	Tavan Tolgoi Tulsh LLC	Expert



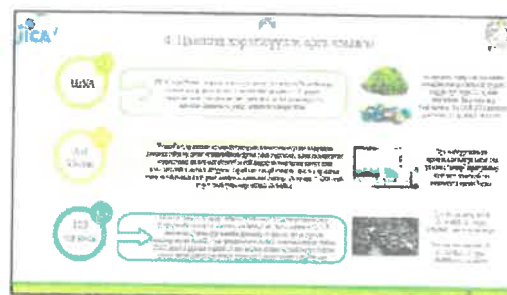
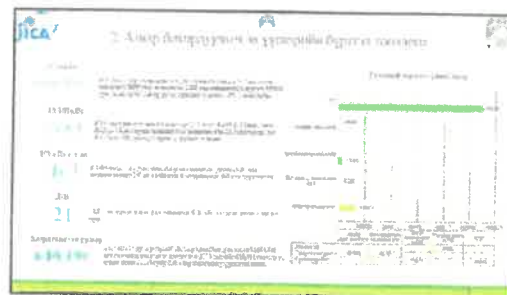
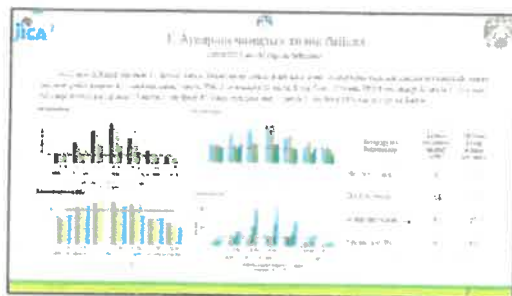
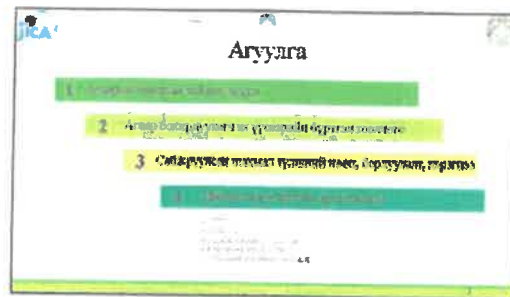
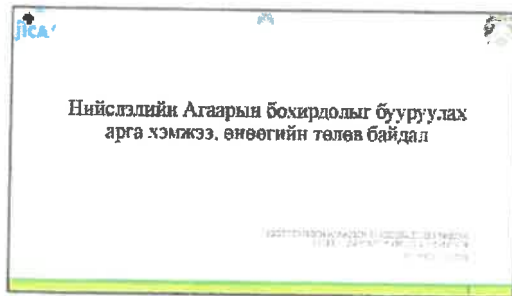

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Монгол улс Улаанбаатар хотын Агаарын
бохирдлын хяналтын чадавхыг бэхжүүлэх
төсөл (3 дугаар үе шат)
ХЗХ-ны 6 дугаар хуралдаан

Явцын танилцуулга

2021 оны 12 сар
ЖАЙКА төслийн бич

Хурлын зорилго

1. Явцын тайлан /Дугаар 3/-г батлах (2020/12~2021/11)
2. Гүйцэтгэлийн тайлан /Дугаар 6/-г батлах (2020/05~2021/10)
3. Цаашдын төлөвлөгөөг батлах (явцын тайлан-3-т тусгах)
4. Тулгамдсан асуудал, хэлэлцэх зүйлс
 - 4.1 ХЗХ-ны 4, 5-р хурлаар хэлэлцсэн асуудлыг тодруулах
 - 4.2 Цаашид тулгамдаж буй асуудалтай холбоотой хүсэлт
5. Япон талын саналыг Монгол талтай хэлэлцэж, эцэслэн батлах
 - 5.1 ТГМ-ын үр дүнтэйг шалгуур үзүүлэлтийг өөрчлөх санал
 - 5.2 ТГМ-д нэмэлтээр оруулах үйл ажиллагааны санал

Хурлын зорилго

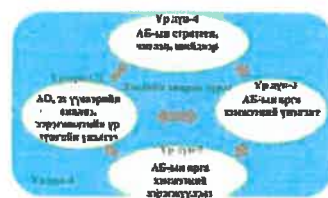
1. Явцын тайлан /Дугаар 3/-г батлах (2020/12~2021/11)
2. Гүйцэтгэлийн тайлан /Дугаар 6/-г батлах (2020/05~2021/10)

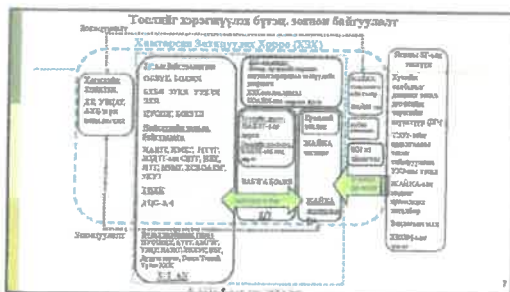
1. Явцын тайлан /дугаар 3/-ын
ерөнхий танилцуулга

1.1 Эрхэм зорилго, төслийн зорилго

- Эрхэм зорилго**
Улаанбаатар хотын агаарын бохирдлыг бууруулах, агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх.
- Төслийн зорилго**
Агаарын бохирдлыг бууруулах үр дүнтэйг өргөтгөх, агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх, агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх, агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх.
- Үр дүн**
1. Агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх, агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх.
 2. Агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх, агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх.
 3. Агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх, агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх.
 4. Агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх, агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх.
 5. Агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх, агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх.
 6. Агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх, агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх.

Төслийн үр дүнд бий болгох агаар орчны
хяналтын үндэс





1.2. ХЗХ-ны хуралдаан, нээлттэй семинар зохион байгуулалт

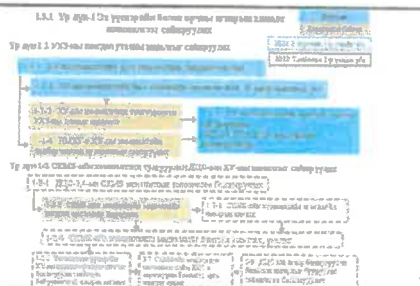
- ХТ/АХ-ийн 3-р хурал (2021.01. 21), ХЗХ-ны 4-р хуралдагт (2021.01. 28)
 - Хэлтэштэй баталсан асуудал:
 - КОВИД-19 улмаас төслийн хугацааг анх 2018.11 ~ 2023.04 сар хүртэл /4.5 жил/ байсныг 2018.11 ~ 2024.07 сар хүртэл /5.9 жил/ султал
 - Үр дүнгүйн шалгууртай баталгаажуулж, төсөл төлөвлөлтөийн мөнгөц (ГТМ)-ыг дотоодыг хувиарлал 1.3/.
- ЗХУТ-ийн ХЗХ-ны гишүүнээр, ХТ/АХ-д "Газар Тогтой Тулм" ХХК-ийн гишүүнээр тус тус хэмжэ
- НАБТ-ын БХХ-ийн дарга, НАБТ-ын дэд даргаар үүрэг гүйцэтгэгч Полмоны төслийн даргаар, АЧХХ-ийн даргын төслийн менежерээр түр томиолон ажилдагддаг

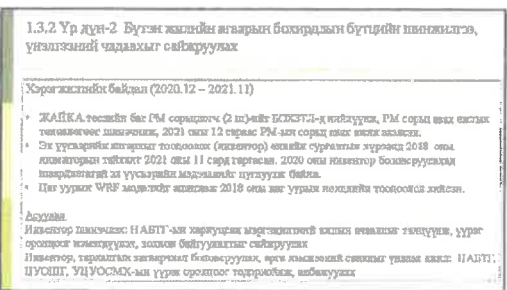
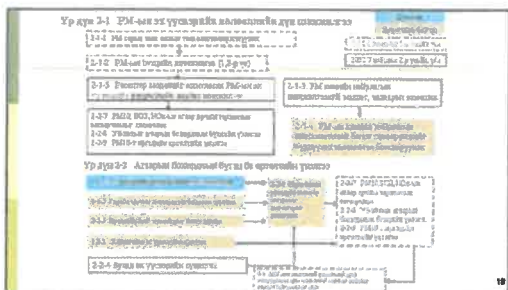
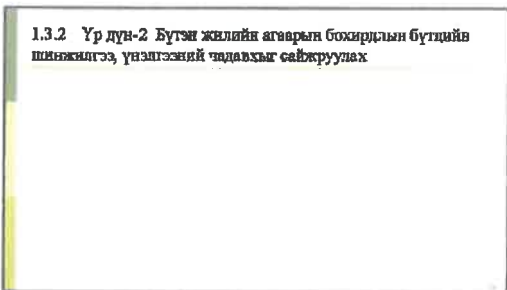
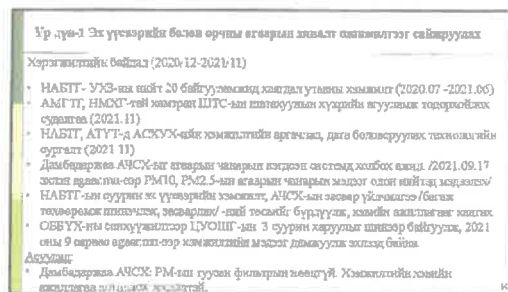
1.2. ХЗХ-ны хуралдаан, нээлттэй семинар зохион байгуулалт

- ХТТ-АХ-ийн 4-р хурал (2021.06.21), ХЭХ-ын 5-р хуралдын (2021.06.24).
- Хэлэлцэхгээг баталсан асуудал:
 - ТТМ-ын үр дүнгийн шалгуурт өөрчлөх, үйл ажиллагааг нэмэгдүүлэх/хязгаарлахын нийруулга, хувиар 1.4;
 - ТТТ компанийн загвар төсөлд илмэг захирлын тусгайлан үйлдвэрлэх, сайжруулсан палимд түлшний автаны хэсэг байгуулах хүсэлтийн дахин гаргалгааг ч нэмэлт талас тодорхой хуртыг өгөөгүй.
- Монгол талас ДРГ-ыг шилжүүлэн суурьшуулж, дэмжээг үзүүлэх хүсэлт гаргаж, ийм тал төслийн хүрээнд дэмжлэг үзүүлэх боломжийг судалж.

1.3. Үр дүнгийн хэрэгжилтийн явц

- ❑ КОВИД-19 халдварын тохиолдол өндөр байна. 165-аас дээшхи өндөр нэгтгэн, суурь өвчтэй хүмүүс эрхэлж өндөртэй, тусгай үүргийн нэгдэлг цэвэрлэ!
- ❑ 2021 оны 11 сараас иргэдийн танилцуулгаг хууль тоог хялгарлах, эрүүл мэндийн асуудалгүй, дараах ажилг хүснэгтүүдтэй
- ❑ НАБТГ, АТГТ-ийн мөргөшгөнтүүдэд АСКУХ-эр хялдан утгааны хяналтын далагч сургуул.
- ❑ ЖАЙКА төслөөс нийлүүлэн зөөврийн хүснэгт аналгзгөрт багцагж өмчлөн УУХУЯ, АМТГТ, НМХУ-тай хялган ЦТГС-ын шатахуулд хуульг сугалагч хүдггг.





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Ү/а 2-1 РМ-ын хамгийн найрмалын индексийг үнэлэх үүсвэрийн боловсролын дүн шинжилгээ

РМ-ын үүсвэрийн индексийг дүн шинжилгээний төрлөө

1. Дундаж үнэлгээг судалж, өөрчлөх буюу үнэлгээг их үүсвэрийн индексийг тодорхойлох
2. Тодорхой зөгт бүтэц агуулсан туршид судалж, үнэлгээг өөрчлөхөд тодорхойлох

Хэрэглэх хувьцаа

Тодорхой 2-р үе шатанд, 1 ш, 3-р үе шатанд 2 ш РМ сорьцогч төлөөрөөсний зүйлүүдийн 3 шат 3 сорьцогчээр 2021 оны 12 сард РМ сорьцогч өөрчлөх ажлын, 2022 оны 21 сард бүтээх. 7х үүсвэрийн индексийг дүн шинжилгээний төлөвлөгөө чадвар гүйцэтгэх ажлын 2022 оны сүүлчид ажлаас эхэлнэ.

РМ-ын үүсвэрийн индексийг тодорхойлох өргөн гүйцэтгэл

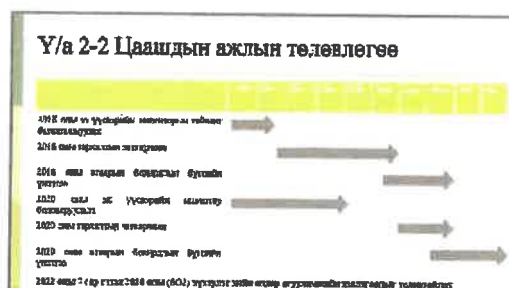
Ү/а 2-2 Тархалтын загварчлал, ресептор модель ашигласан агаарын бохирдлын бүтэц, өртөлтийн үнэлгээ (1)

1. 2х үүсвэрийн индексийг танинчлал дүрэм өсхийн судалж тохирон байгуулах
2. 2018 оны индексийг танинчлал дүрэм өсхийн судалж тохирон байгуулах



Ү/а 2-2 Тархалтын загварчлал, ресептор модель ашигласан агаарын бохирдлын бүтэц, өртөлтийн үнэлгээ (3)

1. УНУОСМАХ-ий хамтран WRF модельг ашиглан 2018 оны индексийг танинчлал дүрэм өсхийн судалж тохирон байгуулах
2. 2020 оны индексийг танинчлал дүрэм өсхийн судалж тохирон байгуулах



Загвар тохирч, арга хэмжээний өөрчлөлийн үнэлгээ

Загвар тохирч	Арга хэмжээний үнэлгээ
~2023.01	2023.06-2023.12
~2023.04	2022.08-2022.11
~2023.04	2022.11-2023.08
~2023.05	2023.01-2024.01 (интервалгүй)
~2023.05	2022.08-2023.12
2022.04-2023.01	2023.02-2023.06
2023.4-2024.3	2024.02-2024.05

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1B

Сайжруулсан шахмал түлшний загвар төслийн үр дүнг баталгаажуулах туршилтын ажлыг (1)

ажайга төслийн бар

- Одоогийн сайжруулсан түлшний агаарыг бохирдлыг бууруулах үр дүнг, холбогдох өсүүдийн талаар мэдэгдсэн хэлбэртэй байгууллагуудтай хамтран ажлаж
- Илүү сайн чанартай сайжруулсан шахмал түлшний үйлдвэрлэлт, утасны хэргийг шалгахын хамт болон үр дүнг баталгаажуулах туршилтыг
- Хүснэгт буй үр дүнг
- Агаарын бохирдлыг бууруулах илүү үр дүнгтэй сайжруулсан шахмал түлш гаргах
- Монгол төд гаргах хүснэгт
- Бэлтгэсэн хэмжээ болон хэлбэр, үр ашгийн тооцоог гаргах, холбогдох өсүүдийн шийдвэрлэх сайжруулсан шахмал түлшний ажлын хэргийг байгуулах
- Монгол тал
- Одоогийн сайжруулсан түлшний хяналт утасны хэмжээг хэргийг, сайжруулсан шахмал түлшний загвар төслийн хэрэгжүүлэлт хэмжээг үзүүлэх.

Сайжруулсан шахмал түлшний загвар төслийн үр дүнг баталгаажуулах туршилтын ажлыг (2)

Зорилго

Илүү сайн чанартай түлш үйлдвэрлэх өмнөх төрөлх /одоогийн сайжруулсан шахмал түлшний илүү чанартай сайжруулсан шахмал түлштэй харьцуулах

Одоогийн сайжруулсан түлш: ТТТ компанийн "сайн түлш"

Савал болгох түлш: Биеэсөөсөн холмтой модныг бржет, халас хожомын хольцтой модныг

Загвар төслийн хэрэгжүүлэх газар

УБ хотод ойроон амралтын газар.

Аргаачил

Сонгоосон байгалийн өсүүдийн стандарт РМ10, РМ2.5, SO₂ хэмжээнийг 3 долоо хоног хийх. Судалгааны өмнөх ба дараах 1 сарын хугацааг одоо ашиглагдаж буй түлшний хэмжээнийг мая 3 долоо хоног хийх.

Сайжруулсан шахмал түлшний загвар төслийн үр дүнг баталгаажуулах туршилтын ажлыг (3)

Сайжруулсан шахмал түлш

Ори нийрэлт

- (1) Нууц: ТТТ компанийн сайжруулсан шахмал түлшний ашиглах байгаа нууц (ТТТ компанийн нийлүүлэлт)
- (2) Биеэсөө: Модны үртэс, бохирдлын дэг, модны аргал бууц зэргийг 10%-иар халгах
- (3) Хэрэгжүүлэгч бодис: $\text{Ca}(\text{OH})_2$ болон ТТТ компанийн сувилж байгаа бусад бодис
- (4) Барилгачууд: ТТТ компанийн сувилж байгаа барилгачууд бодис

Ж.Биеэсөө, хэрэгжүүлэгч бодисын нөлөөллийг судалж байна.

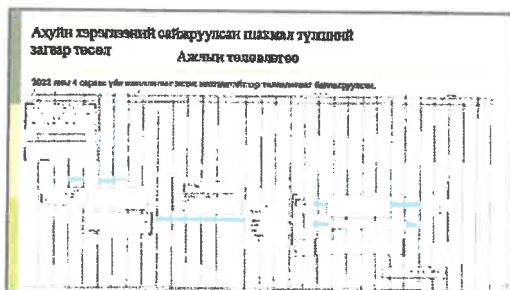
Хэрэгжүүлэх аргаачил

- Ж.АЙКА төслийн бэлтгэсэн төсвийн үзүүлэлт гаргах
- Үйлдвэрлэх процессийг ТТТ компанийн хяналтад.
- Төсвийн ашиглах түлшний хэд хэдэн хувилбарыг үйлдвэрлэх, шалгахын туршилтад үр дүнг сулууран байхыг.

Ахуйн хэрэгжүүлэх сайжруулсан шахмал түлшний загвар төсөл

Хэрэгжүүлэх хугацааны өөрчлөлт

- КОВИД-19 улсваас 2021 оны 12 сарваас 2022 оны 1 сарын хооронд хэрэгжүүлэх хугацааг хойшшуулах, 2022 оны өвлийн улиралд хэрэгжүүлэх.
- Загвар төслийн үр дүнг баталгаажуулах, үнэлэхийг дараа бодит арга хэмжээ болгох чиглэлээр ОББҮХ, бусад байгууллагуудтай зөвлөлдөх.
- ХЗХ-ны 4 дүгээр хуралдааны сайжруулсан шахмал түлшний ажлын хэргийг байгуулах өмнөх загвар төслийн туршилтын ажлыг, лабораторын шинжилгээний дүнг гарсаны дараа дахин хэлэлцэх.

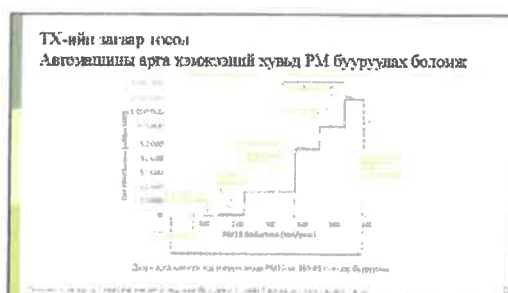


[Handwritten signature]



[Handwritten signature]

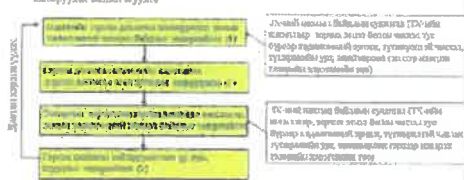
The diagram illustrates a power supply circuit. It starts with a transformer (Т) having a primary winding connected to a 220V AC source. The secondary winding is connected to a bridge rectifier (В). The output of the rectifier is connected to a filter capacitor (С) and a load resistor (R). The diagram is labeled with various components and their connections.

[illegible]

- 10.02.09 – Мэриямен өкілдерінің бірлесіп жұмыс жүргізетұғы.
- 10.02.11 – Әкімдік арасында – «Түркістан облысы» қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.12 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі – «Түркістан облысы» қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.13 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.14 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.15 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.16 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.17 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.18 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.19 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.20 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.21 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.22 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.23 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.24 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.25 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.26 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.27 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.28 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.29 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.
- 10.02.30 – Әкімдік арасында қаржылық өкілдерінің жұмыс жүргізуі.

[illegible]

Гэрлэн дараахыг зохицуулалтыг
байгуулсан нь юу вэ?

[illegible]

Status of respondents				
The 2007-08				
Sample 2007-08				
Time	Present	Not Present	Total	Ratio
0:00	0:16	0:0	0	0%
0:16	0:32	0:0	0	0%
0:32	0:48	0:0	0	0%
0:48	1:04	0:0	0	0%
1:04	1:20	0:0	0	0%
1:20	1:36	0:0	0	0%
1:36	1:52	0:0	0	0%
1:52	2:08	0:0	0	0%
2:08	2:24	0:0	0	0%
2:24	2:40	0:0	0	0%
2:40	2:56	0:0	0	0%
2:56	3:12	0:0	0	0%
3:12	3:28	0:0	0	0%
3:28	3:44	0:0	0	0%
3:44	4:00	0:0	0	0%

[illegible]

(2) Суд дараах тулгуурлан гэрэмжлэхийн бсэх хүндийг өөрчилсөх
(Түгээлгийн үүн үүсвэр)

姓名	性别	年龄	职业	住址	电话
王德胜	男	45	教师	XX路XX号	XXXXXX
李国强	男	38	医生	XX街XX号	XXXXXX
张为民	男	52	工人	XX厂XX号	XXXXXX
陈永年	男	60	农民	XX村XX号	XXXXXX
刘小红	女	28	护士	XX医院	XXXXXX
孙伟明	男	35	工程师	XX公司	XXXXXX

[illegible]

5. INVERTIBLE MATRICES					
M	a	b	c	d	$\det M$
$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	0	3	2	0	1
$\begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix}$	4	2	5	3	0
$\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$	2	6	16	18	0
$\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$	16	6	21	16	0
$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	2	3	24	22	50
$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	0	3	3	0	3

* Рисунок 1. - Численность и структура населения, Рисунок 2. - Численность и структура населения.

ТХ-ийн загвар төсөл

1. Гэрлэн дохионы тооцоуулагч

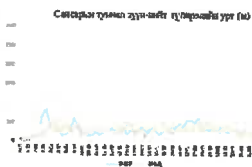
Сигналын түрэмэг зуун-метр гүйдлийн урт (м)

(3) "Гулалтын зуун-метр" -
Гэрлэн дохионы системийн
тохиргоог өөрчилж оур дүн
• Сигналыг гүйдлийн сүүл
уеддн уртгай багасгахын.

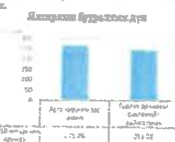
"Уугааран ивдт гүйдлийн урт
(длина "ГТ"-ийн урт) –эт 5% -
нар багасгахын

• Зорилт чиглэлээр иш үзвэл урт
хүдэл ИТ-ийн урт 125 метр
багасгаль хоёр дахин багасч 60
метр болноин.

- (3) Тугаагийн зуун уулавтар - Гүржий долоотой системийн тохиргоотой өөрчлөлтөөс үр дүн
 - Өглөөнийд тугаарын сүргий уявдиг ургагч бөгөөтөн.
 - Уулзаары ивдэг тугаарын урл (нарийн "ТТ-ийн урл") -ийг 5%-аар бөгөөтөн.
 - Зорчих чөлөөтөр шч үзвэл урл талын 137-ийн урл 125 метр бөгөөтөн шч хоёр дахин бөгөөтөн 60 метр бөгөөтөн.



25

[illegible][illegible]

УЗ хатга бүтэн хэлбэрт хуулиг УМ-ын нийт мөнгө 771.6 тунг, түүнчлэн дотоодын системд салбаруудад 20.76 тунг бүтэц 4316 бүтээгдэх бэлтгэлийн баримтат үйлдэл бүтээгдэх үр мөнг 3 сая.54 мян.тунг (1 сая 890 мян.тунг)

Из уравнения Аполлония бесконечным числом точек окружности Γ можно вычислить координаты центров

1

[illegible]

- [illegible]

g

[illegible]

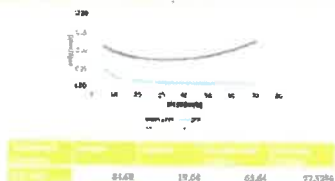
- [illegible]

20

Нийтийн тээврийн бүх автобусанд DPF-ыг суурилуулсан тохиолдолд

Автобусны загвар	PM10 (mg/km) (DPF-ийн өмнө)	PM10 (mg/km) (DPF-ийн дараа)
1-дүгээр	~2.5	~1.5
2-дүгээр	~2.2	~1.2
3-дүгээр	~2.0	~1.0
4-дүгээр	~1.8	~0.8
5-дүгээр	~1.5	~0.5
6-дүгээр	~1.2	~0.2

84.68 19.64 63.64 77.79%



32. சென்னை - தமிழ்நாடு - தலைநகரம் :: புதுச்சேரி - தமிழ்நாடு - தலைநகரம்

③ РМ-ыг бууруулах тохоромж (DPF)

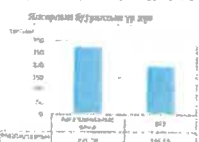
Ян сарын 1-нээс хойшхууцаа ДНФ буюу хэвлэл утасны нүүрстэй физикээр суурингууднаар РМ-ын ашигтай 60%-аар бууруу.

Хүснэгт 1: Ашиг зориулалтаар РМ-ын ашигтай нүүрстэй 27.5 тэрб., ДНФ-ын суурингууднаар 75.5 тэрб. буюу 27.5% нь бууруулах боломжтой.

Зарчигтай харьцангуй бууруулах үр дүнс 39% сал 40% 100 тэрб. тэрб. (18 сал 19% амьт. тэрб.)

Эх сурвалж: Ашигтай зориулалтаар хэвлэл утасны нүүрстэй физикээр 3 сарын 1-нээс хойшхууцаа бууруу.

Из статьи I 729 автобусама DFF буюу хэрхэл уламжлалт тогтог шуугиу факторыг суурьшуулсанар Рд-ийн дотор 80%-аар буюу.



Убављање бујан жетовица кукуруза ФМ-ом износи 271,6 тона, ДФ-ом сукупно износи 75,90 тона буја
27,93 тн Одржане Сажетости

Защитный экран из бурыстого угля 300 см 400 мм 700 мм (12 см 900 мм, 200 мм 700 мм)

24. **symplocos**. Afternoon beauty, yellow, white, and pink flowers. 3' tall, very fragrant, and very hardy.

23

1175



13

- [illegible]

- [illegible]

[illegible]

77. Կարևոր ծրագրերի և ծրագրային ծրագրերի իրականացումը 2017 թ. հունիս, ամս հաշվառման համադրվածությամբ 123,24 միլիարդ ԱՄ. ՊՄ և ծրագրային ծրագրերի:

[illegible]

11/11/2019

Circuit Breaker

A circuit breaker is a switch that can be used to protect a system from a failure. It is a switch that can be used to protect a system from a failure. It is a switch that can be used to protect a system from a failure.

Circuit Breaker State

The circuit breaker has three states: **Open**, **Half-Open**, and **Closed**.

- Open**: The circuit breaker is open, and the system is not working.
- Half-Open**: The circuit breaker is half-open, and the system is partially working.
- Closed**: The circuit breaker is closed, and the system is working.

Circuit Breaker Configuration

The circuit breaker can be configured with the following parameters:

- Open State**: The circuit breaker is open, and the system is not working.
- Half-Open State**: The circuit breaker is half-open, and the system is partially working.
- Closed State**: The circuit breaker is closed, and the system is working.

Circuit Breaker Implementation

```

class CircuitBreaker {
    state: string;
    break() {
        // ...
    }
}

const cb = new CircuitBreaker();
cb.break();
  
```

The circuit breaker is a switch that can be used to protect a system from a failure. It is a switch that can be used to protect a system from a failure. It is a switch that can be used to protect a system from a failure.

♦ **Хүнийг суртал**
Хугацаа: 2022 оны 11 сард
 Судан: Гүрэн дундаар гормын гомеостаз, гестационий өвчлөл
 Оролцогч: Ийнхүүгийн Замын хөдөлгөөний удирдлагын таявч мэргэжилтэн
 ♦ **2 дугаар суртал**
Хугацаа: 2022 оны 5 сард
 Судан: РХ-ын үйлчилгээний газрын шинэчилсэн технологийн гестацион
 Оролцогч: ЦУОИИ, БОХЗТ-ын 8 мэргэжилтэн (орын)
 12 КОИИД: 19-ийн төлөө бодлого бэлтгэх, судалгаа хийх өвчлөл гестацион 2022
 оны 11 сард хэрэгжүүлэх хөдөлгөөл.

24

1176

18

Монгол улс Улаанбаатар хотын Агаарын
бохирдлын хяналтын чадавхыг бэхжүүлэх төсөл
(3 дугаар үе шат)
ХЗХ-ны 6 дугаар хуралдаан

Тулгамдсан асуудал

2021 оны 12 сар
ЖАЙКА төслийн баг

ХЗХ-ны 6-р хурлын зорилго

4. Тулгамдсан асуудал, хэлэлцэх зүйлс
 - 4.1 ХЗХ-ны 4, 5-р хурлаар хэлэлцсэн асуудлыг магадлах
 - 4.2 Үйл ажиллагааны цаашдын хэрэгжилтэй холбоотой хүсэлт
5. Япон, монгол тал харилцан тохиролцох зүйлс
 - 5.1 ТТМ-ын үр дүнтгийн шалгуур үзүүлэлтийг тодорхойлох санал
 - 5.2 ТТМ-д нэмэлтээр оруулах үйл ажиллагааны санал

4. Тулгамдсан асуудал, хэлэлцэх зүйлс
4.1 ХЗХ-ны 4, 5-р хурлаар хэлэлцсэн асуудлыг магадлах (1)

Олонхийн байдал	Саяах
Согдохгүй. Шийдэж төсөв RSD хуралд анх удаа тусгагдан COVID-19-ийн нөлөөгөөр зогсон ажил хийжээ.	Монгол тал тусгай хурал. 2023 оны 4 сарын өмнө RSD-ыг хянуулах, хяналтын эрх зүйлс орлого бүрдүүлэх - RSD-ыг хянуулахад шаардлагатай зардалыг бүрдүүлэх
Хүснэгт зүйлс: ЗТХЯ нь ТХ-ийн ажиллагааг тусгай хяналтын төлөвлөгөө боловсруулж байгаа, орон үйлдвэрлэлтээ тусгах төсвийн ажиллагааг тусгах "Автохүснэгт тусгай хурал" ийн ажиллагааг хянуулах хуралд төсвийн боловсруулж УИХ-д өргөн барих	Давж хүснэгт гаргах. RSD эгнээр төсвийн хэрэгжилтийг хянах тусгай хурал 2024 оны 3 сард багтаан эхлэх. ТХ-ийн ажиллагааг хянуулах хуралд төсвийн боловсруулж УИХ-д өргөн барих

4. Тулгамдсан асуудал, хэлэлцэх зүйлс
4.1 ХЗХ-ны 4, 5-р хурлаар хэлэлцсэн асуудлыг магадлах (2)

Олонхийн байдал	Саяах
Монгол тал: Салбаруудын тусгай хурал. Салбаруудын тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ.	Монгол тал тусгай хурал. Салбаруудын тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ.
Иймд ХЗХ-ны 3-р хурал (2021 оны 6 сар) ийн тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ.	Иймд ХЗХ-ны 3-р хурал (2021 оны 6 сар) ийн тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ.
Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ.	Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ.

4. Тулгамдсан асуудал, хэлэлцэх зүйлс
4.1 ХЗХ-ны 4, 5-р хурлаар хэлэлцсэн асуудлыг магадлах (3)

Олонхийн байдал	Саяах
ХЗХ-ны хуралдаан (2019, 2021 он-д) тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ.	Монгол тал тусгай хурал. Салбаруудын тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ.
Монгол тал тусгай хурал. Салбаруудын тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ.	Монгол тал тусгай хурал. Салбаруудын тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ.
Монгол тал тусгай хурал. Салбаруудын тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ.	Монгол тал тусгай хурал. Салбаруудын тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ. Тусгай хуралд анх удаа тусгай хурал хийжээ.

4. Тулгамдсан асуудал, хэлэлцэх зүйлс
4.2 Цаашдын хэрэгжилтэй холбоотой хүсэлт (2)

Асуудал	Хариулт
Бутлуурлаг суурилуулах байршил тодорхойгүй, хэлэлцэх, 2022 оны 4 сард багтаан бэлтгэл ажил (бетон суурь) үр суурилуулах байршилг халгахааргүй.	Бутлуур суурилуулах талаар тодорхойгүй, хэлэлцэх, 2022 оны 4 сард багтаан бэлтгэл ажил (бетон суурь) үр суурилуулах байршилг халгахааргүй.







ANNEX III PDM (ver. 1.5)

Project Design Matrix (PDM)

Ver.1.5
Dated: December 9, 2021

Project Title: Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3
Implementing Agency: Air Pollution Reduction Department (DAAP) of Ulaanbaatar (UB) City, Ministry of Environment and Tourism (MET) and Counterpart Working Group (C/P-WG)
Target Group: DAAP, MET, C/P-WG and Relevant Agencies
Duration of the Project: November 2018 – July 2024 (5 years and 9 months)
Project Site : UB City

Narrative Summary		Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Emission reduction at major emission sources is enhanced towards air quality improvement in Ulaanbaatar City.	1. XX% of emissions from major pollution sources is reduced compared with the BAU baseline.	1. One of pilot projects are adopted as full scale implementation by relevant authorities. 2. At least one case of lessons learned from the pilot projects are utilized by the decision makers. 3. Relevant laws, regulations and standards on air pollution control measures are implemented in UB City (At least establishment of one MNS, and/or 70% of compliance in the dust emission standards of existing MNS; MNS5043:2016 (General technical requirement of heat water boiler under 4.2MW) and MNS5919:2008 (Emission limit value and measurement method of power plant, steam boiler)).	1. Comparison between BAU and updated inventory for target year (3 to 5 years after completion of the Project)	
Project Purpose Capacity for air pollution control in Ulaanbaatar City is strengthened, paying special attentions to implementation of effective pollution control measures and to the necessary coordinating mechanism of DAAP and the relevant agencies.			1. The Project reports 2. Interview survey to the relevant agencies 3. Laws, regulations, MNS standards, and ordinances of UB City	
Outputs Output 1: Capabilities of emission monitoring for the major pollution sources and of air quality monitoring are strengthened. Output 2: Capabilities to analyze and evaluate pollution structure of PM, SO ₂ , and NO _x throughout the year are strengthened. Output 3: Capabilities of technical evaluation and preparation of air pollution control measures for implementation are strengthened.	1-1. During the Project duration, at least 50 % of inspections for boiler registration based on emission measurements (including standard and simplified methodologies) are implemented by DAAP and IACC. 1-2. The emission measurement reports are submitted to Project Leader of UB city in charge of air and environmental pollution at least 3 times during the Project duration. 1-3. Emission monitoring for the major pollution sources and air quality monitoring information are shared regularly among the relevant agencies through coordination between DAAP and NAMEM. 1-4. The CEMS measurement is compared with the standard measurement once in a year. 1-5. Distribution of emission measurements from vehicles in UB City is prepared based on the study with RSD at least once a year. 2-1. The results of PM apportionment study are reported at least three times during the Project. 2-2. Pollution structures are assessed at least 3 times during the Project duration including emission inventory, simulation model, PM specification, receptor model, air quality monitoring and population exposure throughout the year. 3-1. Drafts of emission measurement methods and quality standards of improved fuel for households in Ger area are submitted to MASM. 3-2. At least three of implementation plans of the pilot projects are prepared.		1. Emission measurement reports by DAAP / IACC 2. The Project reports 3. Boiler registration database 4. Air quality monitoring monthly reports and annual reports 5. CEMS data 1. The Project reports 1. The Project reports	1. Legal and political framework for air quality management is maintained, which defines decision making mechanism such as NCEPR and professional agencies like DAAP and NAMEM. 2. The COVID-19 pandemic situation will be improved and JICA will be able to send JICA Experts to Mongolia toward April 2021 until the end of the Project.

Output 4: Decision making process for air pollution control is improved by utilizing the Professional agencies including DAAP, NAMEM and the relevant agencies.	4-1. Analysis of air pollution status, short-, medium- and long-term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned) are presented to decision makers at least 2 times. 4-2. Results of pilot project implementation and other Project results are utilized for the revision of NCEPR and for decision making on implementation/non-implementation of pollution control measures at least once.	1. The Project reports 2. Reports on NPREP
Output 5: Air pollution control measures are enhanced for PM, SO ₂ and NO _x emission reduction at major sources.	5-1. At least three pilot projects selected by C/P-WG are implemented 5-2. The results of each pilot project (emission reduction, improvement of ambient air quality and population exposure for PM, SO ₂ and NO _x) are presented to the relevant agencies.	1. The Project reports
Output 6: Legal framework, resource allocation and coordinating mechanism as a Platform for the Air Quality Management Cycle are strengthened for the Outputs 1 to 5.	6-1. At least three of drafts on laws and regulations, such as fuel regulations, MNS emission standards and ordinances of UB City, are submitted. 6-2. More than 3 air pollution control measures and technologies are funded by the sections of the relevant agencies in charge of allocating funds for air pollution control by utilizing technical appraisal guideline provided by the Project 6-3. At least three agreements are made on demarcation of roles of the relevant agencies for air pollution control measures in the Project. 6-4. The operational guideline is distributed to relevant agencies.	1. Laws and regulations, fuel regulations, MNS emission standards and ordinances of UB City 2. Minutes of Meeting of NCEPR 3. Official documents including UB city Governor's orders 4. Operational guideline
Activities		
1-1 1-1 DAAP and IACC reinforce HOB inspections based on on-site stack gas measurements. 1-1-1 DAAP and JICA Experts assess the technical transfer on-site stack gas measurement. 1-1-2 DAAP with JICA Experts re-constructs 2 teams of stack gas measurement. 1-1-3 IACC and the relevant agencies with JICA Experts implement HOB inspection based on on-site stack gas measurement. 1-1-4 IACC with JICA Experts introduces simplified measurement method by using IACC's portable gas measurement equipment including parallel measurement with JIS method, elaboration of manuals and manufacturer's calibration. 1-1-5 DAAP and IACC with JICA Experts elaborate emission measurement reports. 1-1 1-2 TPP3 and TPP4 with JICA Experts enhance emission gas control by utilizing CEMS. 1-2-1 TPP3 and TPP4 with JICA Experts elaborate and implement CEMS operation and maintenance plan. 1-2-2 TPP3 and TPP4 with JICA Experts perform quality control of emission gas data of CEMS. 1-2-3 TPP3 with MET and the relevant agencies elaborates online emission data reporting system for the CEMS. 1-2-4 NAMEM and the relevant agencies share and evaluate CEMS emission data. 1-2-5 NAMEM compiles monitoring data of emissions from TPP2, TPP3, TPP4 and new large heat supply facilities and share them with relevant agencies. 1-3 MRTD and PTSD introduce relevant regulations of vehicles based on emission measurement. 1-3-1 MRTD and PTSD with JICA Experts implement vehicle emission measurements by RSD, assess distribution of vehicles emission intensity and define target vehicles to be regulated. 1-3-2 MRPA and IACC with JICA Experts implement automobile fuel surveys. 1-3-3 JICA Experts conduct training to NRTC, in addition to DAAP, on vehicle emission measurement using on-board emission measurement system, and DAAP and NRTC implement vehicle emission measurement using on-board emission measurement system. 1-3-4 PTSD with JICA Expert transfer the DPF which were installed on 24 large buses by the project "Verification Survey with the Private Sector for Disseminating Japanese Technologies for Emission Reduction of Particulate Matter (PM) from Diesel Buses by DPF" to other buses.	Inputs Japanese side 1. JICA experts (necessary fields) (1) Chief Advisor (2) Air Pollution Control Planning and Policy (3) Emission Measurement for Stationary Sources (4) Ambient Air Quality Monitoring (5) Ambient Air Quality Analysis (6) PM10 and PM2.5 Sampling (7) PM10 and PM2.5 Apportionment Study (8) Emission Inventory (Stationary, Mobile and Others) (9) Air Quality Simulation Modeling / Air Pollution Control Measures Evaluation (10) Auto-mobile Emission Control 1 (Traffic Signal Control) (11) Auto-mobile Emission Control 2 (RSD and others) / Emission Mongolian side 1. C/P and C/P-WG (1) JCC Chairperson (2) JCC Vice-Chairperson (3) Project Director (4) Project Manager (5) Necessary C/P and C/P-WG staff according to the fields of JICA Experts 2. Facility (1) Provision of necessary office space in DAAP and MET (including internet access) (2) CLEM Laboratory Equipment (3) Storage Space for 3. Local cost (1) Counterpart expenses such as salary, allowance, travel cost and accommodation (2) Project administrative expenses	
		1. There are no frequent leaves, transfers or resignations of C/P and C/P-WG members. 2. Necessary coordination among UB city, districts, khoroos and communities in Ger area is secured by Mongolian side for implementation of pilot projects.

1-4 DAAP and NAMEM with JICA Experts strengthen AQMS utilization. 1-4-1 CLEM and JICA Experts assess the current status of equipment in reference laboratory of CLEM and identify necessary actions if necessary. 1-4-2 DAAP reinforces AQMS operation and maintenance based on the plan by Phase 2. 1-4-3 DAAP with JICA Experts starts air quality monitoring at pilot project area for improved household fuels by utilizing mobile AQMS. 1-4-4 DAAP with JICA Experts reinforces the AQMS at Bayankhoshuu station. 1-4-5 DAAP and NAMEM with JICA Experts implement parallel measurement by FRM sampler for PM concentration, and implement quality control of PM measurements of AQMS. 1-4-6 DAAP and NAMEM with JICA Experts maintain the online information system of AQMS. 1-4-7 DAAP and NAMEM share real-time monitoring data with the relevant agencies through the online information system. 1-4-8 DAAP and CLEM with JICA Experts analyze air quality monitoring data and elaborate air quality monitoring reports. 1-4-9 The relevant agencies utilize air quality monitoring data. 1-4-10 DAAP with JICA Experts establishes the data transfer system of air quality monitoring data of Dambadarjaa station to the online information system of AQMS. 2-1 NAMEM and JICA Experts conduct PM apportionment study based on PM speciation throughout the year. 2-1-1 CLEM and JICA Experts elaborate PM sampling plan throughout the year, and implement PM samplings. 2-1-2 JICA Experts perform PM speciation analysis in Japan. 2-1-3 NAMEM and CLEM with JICA Experts learn PM speciation technologies (ion analysis, element analysis and carbon analysis). 2-1-4 NAMEM and CLEM with JICA Experts formulate equipment and laboratory plan for PM speciation. 2-1-5 DAAP and NAMEM with JICA Experts perform PM apportionment study based on receptor modeling. 2-2 DAAP and NAMEM with JICA Experts evaluate air pollution structure and health impact based on air quality simulation model and receptor model. 2-2-1 DAAP and NAMEM elaborate plans for updating emission inventory. 2-2-2 DAAP TCC and PTSD implement studies for mobile sources including update of emission inventory, examination of traffic signal control, traffic volume and vehicle traveling speed. 2-2-3 DAAP and JICA Experts select the pilot areas and assess Ger stoves usage pattern (type and model of stoves, seasonal pattern of usage, insulation of Ger housing and coal consumption). 2-2-4 DAAP and NAMEM with JICA Experts implement studies for other emission sources as necessary. 2-2-5 DAAP and NAMEM with JICA Experts elaborate BAU (Business as usual) scenario for the future year based on TPPs future development plans, projection of number of vehicle, population, economic growth, emission regulation, fuel quality regulation and so on. 2-2-6 DAAP and NAMEM update emission inventory for the present year and the future year for the BAU scenario. 2-2-7 DAAP and NAMEM update the air quality simulation model for PM10, SO₂ and NO_x. 2-2-8 DAAP and NAMEM evaluate the air pollution structure of UB city. 2-2-9 DAAP and NAMEM evaluate indicative population exposure of PM10 based on population weighted concentration and so on. 3-1 DAAP and the relevant agencies elaborate a draft MNS on an emission measurement method of improved fuel and fuel quality, and propose it to MASM. 3-2 ME with JICA Experts elaborates safety standards on the household gas distribution. 3-3 DAAP and the relevant agencies elaborate implementation plans and terms of reference for pilot projects such as improved fuel, HOB, traffic signal control, eco-driving, RSD, smoke belching program based on portable emission device, DPF, low sulfur fuel and low emission vehicles. 4-1 DAAP and NAMEM submit to the decision makers the analysis of air pollution status, short-, medium- and long-term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned). 4-2 Relevant agencies with pilot projects elaborate technical guidelines and utilizes them. 4-3 The relevant agencies discuss and endorse the selection of pilot projects. 4-4 NCEPR and the relevant agencies approve large scale investments based on pilot projects implementation and assessment. 4-5 NCEPR, or the sections of the relevant agencies in charge of allocating funds for air pollution control in the Mongolian government such as the Environment and Climate Fund utilizes the Outputs of the Projects and pilot projects implementation and assessment.	Measurement 2 for Air Pollution Control Measures (12) Clean Coal Technology for Air Pollution Control Measures (13) CEMS Data Analysis (14) Stationary Source Emission Control Measures (15) Air Quality Administration (16) Public Awareness and Public Relations 2. Training (1) Local seminars and workshops (2) Training course in Japan 3. Provision of necessary equipment 4. Local cost Necessary expenses for activity of JICA Experts
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5-1 DAAP with Health Department of Capital City and the relevant agencies implements public awareness and advisory activities for citizens including school students and parents. 5-2 MET and DAAP publish progress of the Project by newsletter, newspaper articles, web-site and other medias. 5-3 DAAP and JICA Experts provide technical guidance to manufacturers for improved fuel production. 5-4 The relevant agencies with JICA Experts implement pilot projects according to the implementation plan by Activity 3-3. 5-5 The relevant agencies with JICA Experts evaluate pilot projects results in terms of emission reduction, air quality improvement and exposure to citizens, and extract lessons learned. 5-6 The relevant agencies with JICA Experts report the pilot projects results to NCEPR. 5-7 TPP3 and TPP4 analyze CEMS data, and examine viable air pollution control measures. 5-8 TPP3 and TPP4 with JICA Experts elaborate emission reduction plans. 6-1 The relevant agencies discuss and elaborate written agreements on demarcation of roles in air quality management related with each Output and Activity of the Project. 6-2 DAAP with JICA Experts submits technical documents to NCEPR for improved fuel standard, emission standard on stationary sources, mobile sources and other emission sources, and revision of ordinance. 6-3 NCEPR and the relevant agencies elaborate fuel standard and emission standard, and submit them to MASM. 6-4 Relevant ministries / relevant agencies of UB city elaborate laws, regulations and ordinances on air pollution control measures, and submit them to national parliament / city council. 6-5 JICA Experts provide training on air pollution control measures and technical appraisal guidelines for staff of the sections of the relevant agencies in charge of allocating funds for air pollution control. 6-6 Staff of the sections of the relevant agencies in charge of allocating funds for air pollution control with JICA Experts improve relevant operations with allocating funds for air pollution control measures, if necessary. 6-7 Mongolian side enhances donor coordination in air pollution control. 6-8 Relevant agencies of pilot projects with JICA Experts develop an operational guideline for elaboration, implementation and evaluation of air pollution control measures based on pilot projects implementation.	Pre-conditions 1. Appropriate number of qualified staff of C/P and C/P-WG is assigned. 2. Adequate amount of budget related with the Project implementation is secured. 3. Necessary human resources mobilization related with pilot projects is secured by Mongolian side.
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AGMS: Air Quality Monitoring Station

BAU: Business as Usual

CEMS: Continuous Emission Monitoring System

CFWH: Coal Fired Water Heater

C/P: Counterpart

C/P-WG: Counterpart Working Group

DAAP: Department of Against Air Pollution of Capital City

DPF: Diesel Particulate Filter

FRM: Federal Reference Method

HOB: Heat Only Boiler

IACC: Inspection Agency of the Capital City

MASM: Mongolian Agency for Standardization and Metrology

MET: Ministry of Environment and Tourism

MMH: Ministry of Mining and Heavy Industry

MNS: Mongolian National Standard

MRPA: Mineral Resources and Petroleum Authority

MRTD: Ministry of Road and Transport Development

NAMEM: National Agency for Meteorology and Environment Monitoring

NPREP: National Committee for Environment Pollution Reduction

NRTC: National Road Transport Center

PTSD: Public Transportation Service Department of the Capital City

PM: Particulate Matter

RSD: Remote Sensing Device

TCC: Traffic Control Center of the Capital City

TPP: Thermal Power Plant

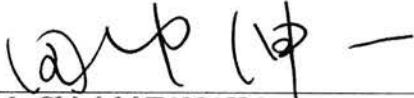
MINUTES OF MEETING OF
THE SEVENTH JOINT COORDINATING COMMITTEE MEETING
ON JAPANESE TECHNICAL COOPERATION FOR
CAPACITY DEVELOPMENT PROJECT FOR AIR POLLUTION CONTROL IN
ULAANBAATAR CITY PHASE 3 in MONGOLIA

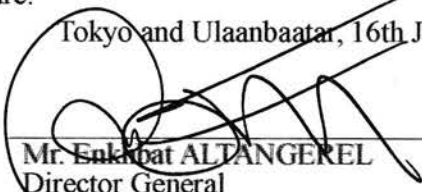
The Japan International Cooperation Agency (hereinafter referred to as "JICA") Supervisory Team for "Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3 in Mongolia (hereinafter referred to as "the Project"), JICA Mongolia Office, and JICA Expert Team (hereinafter referred to as "JET") had a series of meetings with Department of Against Air and Environmental Pollution of Capital City (hereinafter referred to as "DAAEP"), Ministry of Environment and Tourism (hereinafter referred to as "MET") and Joint Coordinating Committee (hereinafter referred to as "JCC") members from 23rd May to 9th June 2022 to discuss the Progress Report 4, Monitoring Sheet No.7, and held the seventh Counterpart Working Group (hereinafter referred to as "C/P-WG") meeting in online video format on 6th June and the seventh JCC meeting of the Project chaired by Mr. Enkhbat ALTANGEREL, Director General of Environment and Natural Resources Management Department of Ministry of Environment and Tourism in hybrid format on 9th June 2022. Participants list of the seventh JCC meeting is shown in Annex I.

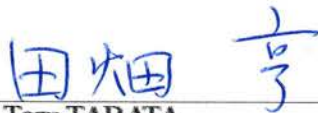
Japanese side and the Mongolian authorities had a series of discussions. As a result of discussions, both sides agreed on matters referred to the document attached hereto.

The parties acknowledge and agree that this Minutes of Meetings may be executed by electronic signature, which is considered as an original signature for all purposes and has the same force and effect as an original signature. "Electronic signature" includes faxed versions of an original signature or electronically scanned and transmitted versions (e.g., via pdf) of an original signature.

Tokyo and Ulaanbaatar, 16th June 2022


Mr. Shinichi TANAKA
Leader, JICA Supervisory Team,
Chief Representative
JICA Mongolia Office
Japan International Cooperation Agency,
Japan,


Mr. Enkhbat ALTANGEREL
Director General
Environment and Natural Resources
Management Department, Ministry of
Environment and Tourism, Mongolia


Mr. Toru TABATA
Leader, JICA Expert Team, Japan


Mr. Choigunsen CHIMEDSUREN
Director General
Development Financing Department
Ministry of Finance, Mongolia

ATTACHED DOCUMENT

I. Progress Report 4 and the Project Monitoring Sheet 7

JET explained the progress of the Project, future activity plan, and issues that the Project is facing since its beginning. After active discussions, the JCC approved the Progress Report 4 and the Project Monitoring Sheet 7.

II. Revision of the Project Design Matrix

1. Project Design Matrix (Revision of Organization Name)

The Japanese side proposed the revision of the Project Design Matrix (hereinafter referred to as PDM), which was approved by the Mongolian side. The revised contents in the PDM are indicated in Annex II.

III. Demand from the Japanese side of the issues on the future project activities

1. Demand for transfer of Diesel Particulate Filters (hereinafter referred to as "DPFs")
Transfer of DPFs is an additional activity requested by the Mongolian side. However, since only the Japanese side is performing this activity, it is difficult to transfer DPFs at this point. Currently since there is no incentive for bus companies to install DPFs, the cost of labor and consumables to maintain and manage DPFs is a freight for the bus companies which are using DPFs. In addition, even if the DPFs are transferred this time, there is an issue that DPFs will no longer be used in a few years, so it is necessary to establish a system of operational method for continuous utilization of DPFs.. Therefore, the Japanese side demanded the following to Public Transportation Service Department (hereinafter referred to as "PTSD") of the Capital City;

- (1) Check and report on the status of current DPFs equipment (number of pieces, working condition, etc.) for transfer of DPFs
- (2) Develop a support plan for transfer of DPFs
- (3) Selection of bus companies and buses to which DPFs will be transferred
- (4) Develop an implementation plan for operational support to the bus company after DPFs are transferred
- (5) Develop an implementation plan that includes incentives for bus companies operating DPFs and secure a budget for this purpose

Ms. Tsesehmaa SAIKHANJARGAL, head of PTSD responded that:

- (1) Report on the status of current DPFs equipment (number of pieces, working condition, etc.) for transfer of DPFs will be submitted by July 5, 2022.
- (2) PTSD will make efforts to develop a support plan for transfer of DPFs.
- (3) PTSD has already selected bus companies to transfer DPFs and has requested that the bus companies provide a list of busses to be transferred.

PTSD will review and respond for items (4) and (5) from now on.

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2. Demand for securing human resources and succession of duties necessary for the project

JET had implemented the technology transfer of inventory and auto vehicle emissions measurement to DAAEP on multiple occasions, however, once again personnel in charge of DAAEP left without succession of duties. The Japanese side demanded that DAAEP not only take over the files under the responsibility of DAAEP, but also DAAEP raises its capacity to at least the same level as its predecessor. The Japanese side also demanded that DAAEP provides a clear answer as to how this issue would be resolved.

Mr. Davaajargal GAN-OCHIR of DAAEP responded that DAAEP recognizes that one of the challenges for DAAEP is the lack of sustainability of human resources who were transferred technology. DAAEP has not been able to sustain its human resources and organizational capacity due to personal circumstances such as retirement and study abroad. For the emission inventory, a person in charge of the inventory retired in March 2022, and a staff who was in charge of the inventory previously is scheduled to return from maternity leave. The sustainability of the capability to develop inventories will be maintained due to the return of experienced person in charge. A person in charge of auto vehicle emissions measurement is being considered and is in the process of being appointed.

IV. Request based on the 4th, 5th and 6th JCC

1. Establishment of a forum to discuss household improved fuels

JET considers that there is not enough opportunity to discuss results of the pilot project of household improved fuels and cost-effectiveness of household improved fuels only in the JCC meeting and C/P-WG meeting.

The Japanese side requested that:

- (1) An expert meeting on improved fuel will be held to consult the Mongolian side's opinion on improved fuels in the pilot project.
- (2) A meeting will be held with higher level decision-makers such as National Committee for Environmental Pollution Reduction (hereinafter referred to as "NCEPR") to report results of the pilot project and its cost effectiveness in order to propose household improved fuels to the Mongolian government.

Mr. Ganbold TSOG, Acting Head of DAAEP mentioned that the Japanese side and the Mongolian side will continuously discuss improved household fuels to be produced in the future.

V. Other Issue

1. Mr. Altanzul BASSAHJAV, Secretary General of NCEPR mentioned the following;

- (1) From 2018 to the present, the situation of auto vehicle traffic volume has changed. Since a ratio of emissions from auto vehicles in air pollution should be increasing, he requested the Japanese side to study the emissions from auto

vehicles.

- (2) Regarding the transfer of DPFs, it has been pointed out that the operational management of DPFs is inadequate, and he requested the Japanese side to add 100 units of DPFs equipment in the project budget.
- (3) The Mongolian side is performing tests to improve the quality of household improved fuels, and results are clear. He requested the Japanese that the pilot project of household improved fuels is discontinued, and the project budget will be used for the provision of detectors for the prevention of Carbon Monoxide (hereinafter referred to as "CO") poisoning and the transfer of technology related to this purpose.

Mr. Natsuji SAWAKI, Vice Leader of JET responded that the Japanese side implemented an auto vehicle traffic volume survey in 2019. Since auto vehicle traffic volume is increasing, the auto vehicle traffic volume survey will be done in 2022 to create an emission inventory for 2022 that reflects the actual situation. He also responded that the 24 DPFs provided under other JICA schemes are not being utilized. Therefore, as a first step, it is necessary for the Mongolian side to establish a system of operational method for continuous utilization of DPFs. The cost of providing 100 DPFs is approximately USD 1,400,000. Since the purpose of this project is not to provide equipment, it is not possible to provide an additional 100 DPFs to the Mongolian side.

Mr. Hajime ENDO, person in charge of Clean Coal Technology and Pilot Project for Improved Fuel of JET responded that there are two problems with the current improved fuels: first, when using the improved fuel, Sulfur Dioxides (hereinafter referred to as "SO₂") concentration in the air quality is higher than when using raw coal. Currently, Tavan Tolgoi Tulsh LLC (hereinafter referred to as "TTT") does not add desulfurizer to its improved fuel. Therefore when using the improved fuels, SO₂ emissions are three to four times higher each year than when using raw coal. The second is CO. CO emissions using improved fuel must reduce CO emissions to at least the same level as raw coal. CO emissions concentration of the improved fuel must be reduced to at least the same level as raw coal. Since the current improved fuel tends to generate CO when it was burned, the focus of improvement for the improved fuel is how to reduce CO concentration. The first measure should be to produce the improved fuel that emits less CO. Increasing the number of instruments is the second measure. JET would like to consult with the Secretary General of NCEPR on whether or not to implement the pilot project in the future.

VI. Other Comments from the Mongolian side

1. Mr. Munkhbat TSENDEEKHUU of MET mentioned that:

- (1) Regarding Euro 5 fuels, The Mongolian Government decided to amend the Air Law dated April 22, 2022 by adding a stipulation in Article 16.1.6 to provide retail and sale of the highest grade fuel of Mongolian National Standards

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(hereinafter referred to as “MNS”) and to prohibit the retail and sale, etc. of lower grade fuel in Air Quality Improvement Area of Ulaanbaatar City.

- (2) Ministry of Energy is drafting a revision of MNS 5689: 2019 for improved fuels. As the Improved Fuels Pilot Project is implemented in the winter of 2022, he requested JET to implement a pilot project in the future with the proposed revision of MNS, which is targeted to produce household improved fuels of good quality in the future. Regarding the issue of consultation on household improved fuels at the decision-maker level, he requested that JET with the Ministry of Energy will discuss a course of action, including the revision of MNS 5689:2019.

Mr. Hajime ENDO of JET responded that Yesterday, JET discussed with the Minister of Energy, TTT and DAAEP, and JET would like to have more opportunities to discuss with the Ministry of Energy. Regarding the revision of MNS5689: 2019, the Mongolian side will only revise the criteria of industrial analytical values for the quality of improved fuels. Air pollution will not improve unless the emission concentrations when improved fuels are burned are regulated. Regarding MNS, emission standards for improved fuel should be decided as soon as possible. Combustion test laboratory of DAAEP should be utilized to conduct exhaust gas measurements of the improved fuel to verify exhaust gas concentrations, and then the improved fuels should be burned in a private stove to verify combustion conditions. Based on them, emission standards will be developed. Currently, the Mongolian side judges the quality of the improved fuels only based on the combustion conditions of the fuel burned in the stove. Under this condition, it is difficult to reduce air pollutant emissions from improved fuels.

2. Mr. Ganbold TSOG, Acting Head of DAAEP stated that the 62nd Cabinet Decision of the Mongolian Government on February 28, 2018 "On the Prohibition of Raw Coal Use" was amended on June 8, 2022, and Nalaikh District was added to the Air Quality Improvement Area. Accordingly, revision of Air Quality Improvement Area Enforcement Regulation for 2022 is necessary. He requested the Mongolian side to consider whether prohibit on the retail and sale of fuels below EURO 5 regulation in Ulaanbaatar City could be included in the Air Quality Improvement Enforcement Regulations.
3. Mr. Khishigdalai of Ministry of Mineral and Heavy Industries (hereinafter referred to as “MMHI”) mentioned that the legal foundation has been established through the amendment of the Air Law. However, the Air Law stipulated the prohibition of the use of fuels other than EURO 5 standard, improvement of the environment, including laws and regulations to implement the regulation, is not yet. The price difference between EURO 2 and EURO 5 fuel is significant freight. He requested that the project activities will include an awareness campaign to improve awareness

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regarding introduction of EURO 5 fuel as well as eco-driving. He also demanded that Ulaanbaatar City will implement countermeasures, such as mandating the use of EURO5 fuel for public transportation busses.

4. Mr. Batbayar JADAMBA of National Agency for Meteorology and Environment Monitoring (hereinafter referred to as "NAMEM") commented that cooperation and participation of the Mongolian side is insufficient in achieving project goals, and cooperation of the Mongolian side is necessary to achieve the indicators. Therefore, he proposed 2 suggestions. First, the Mongolian side evaluated that the introduction of household improved fuels has almost solved the air pollution problem, it is only an improvement to some extent of the terrible situation of air pollution. Until air quality standards are met, it is not able to be said that air pollution problem has been truly solved. Some commented that the pilot project should be discontinued, however, the pilot project should be implemented. Second, he will discuss with Head of DAAEP regarding joint agreement on the role sharing in developing emission inventories, implementing simulation models, and assessing air pollution control measures between DAAP, NAMEM and Information and Research Institute of Meteorology, Hydrology and Environment, and issue the joint agreement. He also stated that because simulation and inventory tasks require specialized knowledge, it is important to ensure that skills are transferred and sustained even as people change.

END

ANNEX I Participants of Seventh Joint Coordination Committee

ANNEX II Presentation of Progress Report 4 and Monitoring Sheet No.7, Revised
Activity Plan and Important Issue

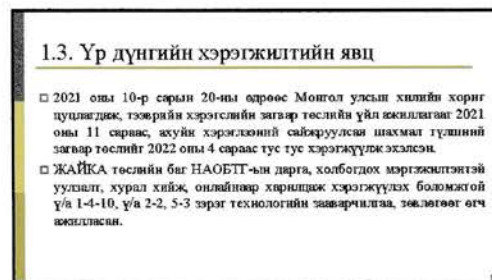
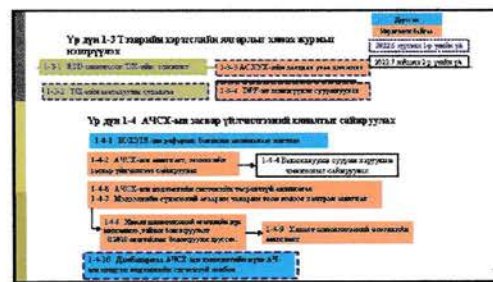
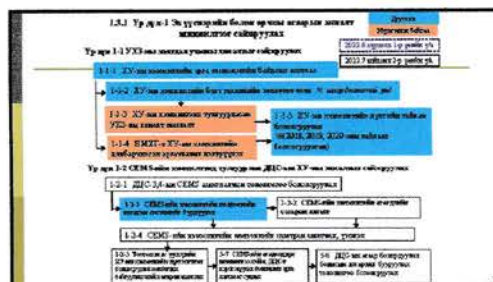
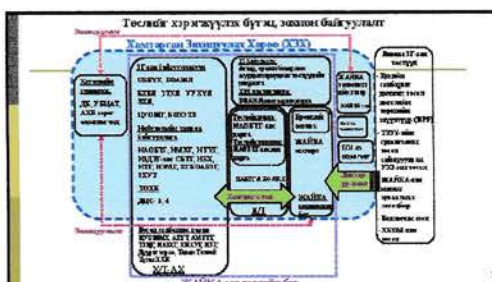
ANNEX III PDM (ver. 1.6)

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ANNEX I Participants of Seventh Joint Coordination Committee

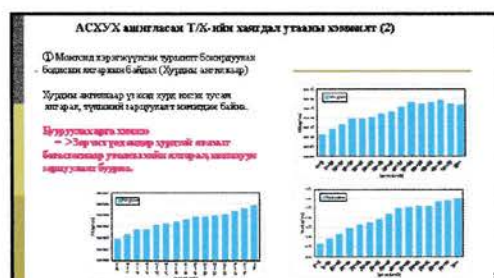
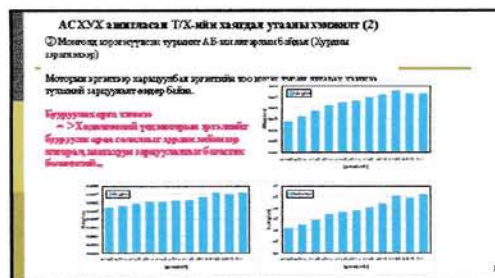
	Name	Organization	Position
1	Mr. Enkhbat LT TANGEREL	Ministry of Environment and Tourism, Environment and Natural Resources Management Department,	Director General
2	Mr. Munkhbat TSENDEEKHUU	Ministry of Environment and Tourism, Environment and Natural Resources Management Department,	Officer
3	Mr. Luvsantseren ICHINKHRLOO	Ministry of Energy Fuel Policy Implementation and Coordination Department	Director General
4	Mr. Khishigdalai CHULUUN	Ministry of Mining and Heavy Industry, Fuel Policy Department	Director General
5	Ms. Mongolmaa DORJNAMJIL	Ministry of Mining and Heavy Industry, Fuel Policy Department	Head of Department
6	Mr. Baysgalan BATSAIKHAN	Ministry of Road and Transport Development, Policy and Planning Department Air Pollution Reducing and Green Development Division	Expert
7	Ms. Bolormaa DARHIJAVI	Ministry of Construction and Urban Development, division of Policy and Planning	Officer
8	Mr. Altanzul BASSAHJAV	Secretariat of the National Committee for Air Pollution Reduction	Secretary- general
9	Mr. Batbayar JADAMBA	National Agency for Meteorology and Environment Monitoring Environment Monitoring Division	Head of Division
10	Mr. Munkhbold ADIYA	Mayor's office Development Policy Planning Department	Head of Department
11	Ms. Tsetsegmaa SUKHBAATAR	Public Transport Service Department	Head of PTSD
12	Mr. Adiyasuren SAIKHANJARGAL	Traffic Control Center of the Capital City	Director General
13	Ms. Narangerel NAMSRAI	Inspection Agency of the Capital City Division of Air Quality Control	Head of Division
14	Ms. Ulziisaikhan DAGDAN	Urban Regulation, Environmental Safety Control Coordination Department Environmental Safety Control Division	Head of Division
15	Ms. Nomin DASHZEVEG	Urban Regulation, Environmental Safety Control Coordination Department Environmental Safety Control Division	Expert
16	Mr. Ganbold TSOG	Department of Against Air and Environmental Pollution of the Capital City	Acting Head of DAAEP
17	Ms. Tsolmon TSOGBADRAKH	Department of Against Air and Environmental Pollution of the Capital City Head of Policy Implementation Division	Head of Division
18	Mr. Davaajargal GAN-OCHIR	Department of Against Air and Environmental Pollution of the Capital City Air Quality Management Division	Head of Division
19	Ms. Byambatsetseg ENKHBAT	Department of Against Air and Environmental Pollution of the Capital City	Expert
20	Mr. Shinichi TANAKA	JICA Mongolia Office	Chief Representative
21	Mr. Atsuki TAKEDA	JICA Mongolia Office	Project Formulation Advisor

22	Ms. Oyuntsetseg CH	JICA Mongolia Office	National Staff
23	Mr. Hiroaki TAKIGUCHI	JICA Headquarter JICA Supervisory Team	Senior Technical Advisor (Environment)
24	Mr. Kouji MAEJIMA	JICA Global Environment Department Environmental Management Group Environmental Management Team 1 JICA Supervisory Team	Deputy Director
25	Mr. Toru TABATA	JICA Expert Team	Chief Advisor
26	Mr. Natsuji SAWAKI	JICA Expert Team	Sub Leader
27	Mr. Atsushi SATO	JICA Expert Team	Group Leader of Auto- mobile Countermeasure
28	Mr. Hajime Endo	JICA Expert Team	Clean Coal Technology / Pilot Project for Improved Fuel 1
29	Mr. Nobuhiro KOYANAGI	JICA Expert Team	Production of Improved Fuel
30	Mr. Jun OKABE	JICA Expert Team	Auto-mobile Emission Control 2/ Emission Measurement for Mobile Sources
31	Mr. Shinya NAKATA	JICA Expert Team	Air Quality Simulation Model / Air Pollution Control Measures Evaluation / Emission Inventory
32	Mr. Yukino YAMAKAMI	Embassy of Japan in Mongolia	Second Secretary



Автошатахууны хүүхрийн судалгаа
Дэлхийн хүүхдийн агууламж өндөр (1 гастр 2000 рол-тос дөнгөж байсан)

Gas. татвир	Type of Fuel	Grade	Байнгын
A	Gasoline	02	351
		05	51
B	Gasoline	02	1801
		05	20
		02	366
		05	63
C	Gasoline	02	44
		05	31
		02	208
		05	87
D	Gasoline	02	420
		05	375
		02	8
		05	901
E	Gasoline	02	120
		05	2
		02	49
		05	2373



1.3.2 Үр дүн-2 Бүтэн жилийн агаарын бохирдлын бүтцийн шинжилгээ, үнэмлэхүйн чадавхыг сайжруулах

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Хэрэгжээний байдла (2021.12 – 2022.5)

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*III: Така Тимоті Платонівський снігочув не був!

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Activity 1

Ялгавар байгааг ТХ Импортёр татварын хөнгөлөлт 50% байгааг 100% хөнгөлөх зорилгын төсөл хэлэлцээнд байгаа боловч хязгаар утгагүй ялгаврын стандартыг зургаанх, дууламж талээр сунгалтаа хийгдээгүй. **Тогтворийн шүүмүүл (DPE)** DPF өмчлөх НГУУ-ын ажиллагааг мөнгөтэй хяналтгүй. Евро-5, цэцэглэнг автобусанд бүрэн шилжих бодлого баримтлах учраас DPF-г шинжлүүлэн суурилуулж төлөвлөгөө байхгүй.

SAMPLE DESCRIPTION	M		A		VM		FC		TS		GCV
	(a°)	(b°)	(a°)	(b°)	(a°)	(b°)	(a°)	(b°)	(a°)	(b°)	
	%	%	%	%	%	%	%	%	%	%	
Berni e d. 12.5%	0.64	25.2	19.4	17.5	50.7	0.07	0.08	8.5			
Berni e d. 25%	0.70	25.5	17.9	15.1	57.8	1.00	1.01	8.0			
Berni e d. 50%	0.78	26.0	13.7	13.9	50.5	1.05	1.06	6.02			
Berni e d. 100%	0.69	26.9	0.7	0.9	83.0	1.00	1.06	5.00			
Caovet 14%	0.72	24.9	22.6	22.7	51.8	0.90	0.90	5.07			
Stamberg Coo d. 15%	0.72	25.5	24.8	24.8	40.2	0.76	0.80	5.55			

Сайжруулсан түлшний загвар төслийн хэрэгжилт
(2021/12~2022/5)

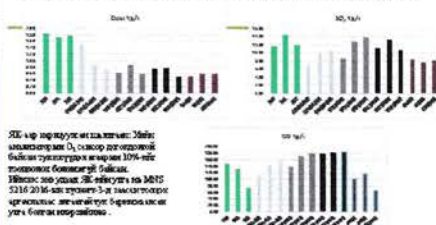
- ☐ 2022 оны өвөл: агаар-төсөл агаарын түвшнийг өсөхтэй зэрэгцээгөөр 6 төрлийн түвшнийг халцан улааны нээхтэйг лабораторын орчинд хийж байлаа.
- ☐ Түүхийн дүн төсөлдүүлж.

1. Державні органи

Ухаа хүнийн үзэгдэлтэй хамт хамс. Бичлэггүй хотынхны

Document ID	Document Title	Document Type	Document Status	Document Date	Document Author	Document Reviewer	Document Approval
1	100	100	100	100	100	100	100
2	100	100	100	100	100	100	100
3	100	100	100	100	100	100	100
4	100	100	100	100	100	100	100
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8	100	100	100	100	100	100	100
9	100	100	100	100	100	100	100
10	100	100	100	100	100	100	100

4. Түлхүүж твөс, SO₂, CO-ын ятархай коэффицент харьцуулалт



2022 оны 6 сар
ЖАЙКА төслийн баг

- 2022 оны 10 сарын НАОБТ-ын хэмжээгэнд НМХТ-ын ТЕСТС-40-ийг шалтган харуулахуудын хэмжээний үзлийг сурталыг зохион байгуулсан.
- ДДС-3, 4-ийн СЕМС-ын төлөөллийг үзлийг үйлдүүлж, чарын хамтны 2021 оны хэрэгтэйг байдал, 2021 оны төлөөллийг үзлийг судалж.
- БОАЖЯ, ПУШП-ын дархад мэдээллийг авч, хэрэгтэйг үзлийг
 - 2021 оны СЕМС-ын хэмжээний дүн, мэдээллийг холбохдод байгууллагад шалтгаан байдал
 - ДДС-2,3,4, Амгын ДС-ын хамтад утганы хэмжээний дүн, холбогч гэнгээг, холбогчдод байгууллагад мэдээллийг сурталыг байдал
- Дүрх мэдээллийг нийтлэж, шалтгаалайг төлөөллийг үзлийг, зохион ач зөвлөх.

Түгшмэл буй исуудалтай холбоотой хүсэлт, шаардлага
Янги гэрээ санхүүг хэлэлцж, зорилгыг батлах
ГТМ-ын байгууллагын ирээдүй өөрчлөх

- **КСД**
 - 2022 оны намар КСД болон төртөлжит төлөвчлэл (орасуу) -ыг хялбарчилж орлогон буй ТХ-ийн хяналт утганы ажлынхны бүтэц бийдэг гэрээлэлт, хэмжээний тоон өгөгдөл хүснэгт
- Хүүр багтай шалгуурын уялгал
 - Зөврийн бичлэг болжээ ХТЭС-ын шалгуурын үүрхийн хяналтын хэмжээг судалгааг 2021 оны 11 сарын дараахуудад хэсэгд байна.
- АСУУХ-ийг шалгуурууд ТХ-ийн хяналт утганы хэмжээг
 - Энэ хэлбэрээр үр ашгийг төрөлжүүлж, материал бичлэгдэл бүрүүлэх үр ашгийг төлөвчлүүлж (дэлгэрэн байгууллын хэмжээг гэх мэт) үүсгэдэг АСУУХ-ыг хэмжээг хяналт
- ДФН-ын шалгуурын суурилуулалт
 - НТҮГ-д ашиглагдсан хэмжээнийг: байгууллын шалгуурын талаар, ДФН-ын шалгуурын ААН, ажлаарх гэрээний болж, шалгуурын суурилуулалтын талаар дараахууд

□ Төслийн үйл ажиллагаа 2024 оны 7 сар хүртэл үргэлжилнэ.
Энэ удаад 2022 оны 6 сараас 2023 оны 5 сар хүртэлх 1 жилийн
хэрэгжилтийн явцыг танилцуулна.

Хэрэгний хугацаа
Төслийн 2-р үе шатанд 1 ш, 3-р үе шатанд 2 ш РМ сорацдог төхөөрөмжийг хийгүүлдэг.
3 шат 3 сорацдог чөөр 2021 оны 12 сардас РМ сорац зөөх ажилг. хийсэн. 2022 оны 11 сард бүтэн
жилийн сорац авч дуусгана. Энэ үүсвэрийн төлөөллийн дүн шинжилгээний 2 төлөвлөгөөний хадгас
зүйлүүдийг ажилг. 2023 оны хугаас хэрэгжүүлж эхэлнэ.

РБ в углеродном нанотрубчатом композитном полимерном

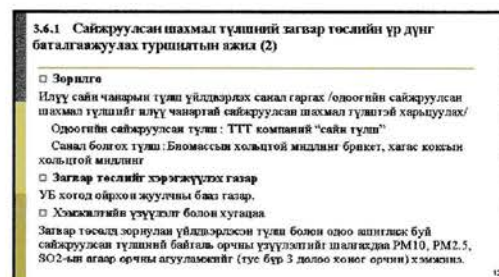
Схематическое изображение структуры композитного материала. В центре находится нанотрубка (НТ), окруженная полимерной матрицей. Вокруг матрицы нанесены слои адгезива. Вдоль поверхности нанотрубки нанесены слои адгезива. Вдоль поверхности нанотрубки нанесены слои адгезива. Вдоль поверхности нанотрубки нанесены слои адгезива.

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3.6 ТХ-ийн загвар төслийг хэрэгжүүлэх, үр дүнд үнэлгээ хийх хугацаа

Загвар төслийг хэрэгжүүлэх үйл ажиллагаа	Загвар төслийг хэрэгжүүлэх хугацаа	Арга хэмжээний үнэлгээ
Тухайн үеийн агаарын бохирдлын бүтэц	~2023.04	2023.06-2023.12
Тухайн үеийн агаарын бохирдлын бүтэц	~2023.12	2023.08-2024.05
ТХ-ийн загвар төслийг хэрэгжүүлэх үйл ажиллагаа	~2023.04	2022.08-2022.12
Тухайн үеийн агаарын бохирдлын бүтэц	~2024.05	2022.07-2024.01 (тасралтгүй)
Тухайн үеийн агаарын бохирдлын бүтэц	~2024.05	2022.09-2023.03
Тухайн үеийн агаарын бохирдлын бүтэц	2022.04-2023.03	2023.02-2023.06
Тухайн үеийн агаарын бохирдлын бүтэц	2023.04-2024.03	2024.02-2024.05



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3. Тогтоогийн шүтлүүр (DPF)

③ DPF-ийн шүтлэлийн тухай
 АХСХХ-ийн байршил болон тухайн газрын өндөр нь PM 4-ий 35%-ыг бүхэлдүүрснэ.

The graph displays the relationship between vehicle speed and PM4 concentration. The x-axis represents speed in km/h, ranging from 0 to 100. The y-axis represents PM4 concentration in µg/m³, ranging from 0 to 0.5. Four data series are plotted: DPF (red circles), DPF-fact (green circles), DPF-fact(data) (red squares), and DPF (data) (green squares). A green callout box highlights a 35% increase in PM4 concentration when comparing the DPF and DPF-fact lines.

3. DPF (дизелийн торлогийн шүүлтүүр)

[illegible]

3. Тогтогний шүүлтүүр (ДФГ)

Амьсгалын суурьлусын байдал

② ДФГ



Монгол төстэйг үр дүн



Шүүр



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◆ Эхний сургалт

Хугацаа: 2022 оны 11 сэр*

Сэдэв: Гэрлэн дохионы горим тохируулга, технологийн дадлага

Оролцогч: Нийслэлийн Замын хөдөлгөөний удирдлагын төв 8 мэргэжилтэн

● 2 дахь сургалт

Хутагцаа: 2022 оны 10 сар

Сэдэв: РМ-ын химийн найрлагын шинжилгээний технологи

Оролцогч: ЦУОШГ, БОХЗТЛ-ын 8 мэргэжилтэн (орчим)

※ КЭВИД-19-ийн нөхцөл байдлын улмаас сургагчид ажлын байрны хуралтгаар хойшлогдсон.

Task		T-03				T-02				T-01			
		1	2	3	4	1	2	3	4	1	2	3	4
Task 1: Design and develop a simple web application	1. Design and develop a simple web application												
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Task 2: Design and develop a simple web application	1. Design and develop a simple web application												
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Task 3: Design and develop a simple web application	1. Design and develop a simple web application												
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	10. Design and develop a simple web application												

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1. **Planning** (10 days)

2. **Design** (20 days)

3. **Procurement** (15 days)

4. **Construction** (30 days)

5. **Installation** (10 days)

6. **Testing** (10 days)

7. **Commissioning** (10 days)

8. **Handover** (10 days)

9. **Evaluation** (10 days)

10. **Reporting** (10 days)

Dependencies: Task 1 to 2, 2 to 3, 3 to 4, 4 to 5, 5 to 6, 6 to 7, 7 to 8, 8 to 9, 9 to 10.

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2022 оны 6 сар
ЖАЙКА төслийн баг

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1. Мэдүүлгийн тусламжтайгаар үйлдлийг 2023.12.26-нд 4
2. Хүндэтгэлийн шийдвэр "Батлах" үйлдлийг 2023.12.26-нд 4
3. Хүндэтгэлийн өрсөлдөөний батлах шийдвэр 2023.12.26-нд 4
4. Хүндэтгэлийг асуудал, хэлэлцэх зүйлс
- 4.1 Цаашдын үйл-ын хүндэтгэлийг холбоотой шаардлага
5. Япон талын санхүүг хэлэлцэх, эмгэлэн батлах
- 5.1 ТТМ-ын байгууллагын кирилл өөрчлөх

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Одоо ний байхал	Шяардлага
- Илүү чамартай сайруулах туслах; санаа болгох туршилтаа түгшин ур дунд ашиглай тавар. Могой толгоо тавих, хуучин хуучин хуучин хуучин хуучин байгууллагад тэмдэг, хэмжээг тооцож байх. - Могой урсган төрлийн бодолгоо туршид үргэлжлүүлж бодой даа эхлээж болгодог ХХХ боловч ХХХ-ийн үргэлжлүүлж гадна хийгээр гарж түгшин байгууллага, хэлэлцүүлж шяардлагааг дор урсж байна.	Звигар тэсгэл ур дунд тайлгах, илүү сайруулах түгшин санаа болгох, могой зардлагаа туршид түгшин тайлгах, хийгээр сайруулах түгшин сайруулах түгшин хийгээр зөвлөхгүй зохих байгууллага хүснэ байна.

Асуулал	Шийдэл
2021 оны 11 сарын 2022 оны 4	НАОБТ-ын өсүүлсэн технологийг сэр хүртэл ТХ-ийн хамтад хадгалах үлдээх ажлыг олон удаа утвины хэмжээний технологиуд таслуулж байгаа асуудал дээрх сүрьеа ажлыг НАОБТ-г дэхиш шийдвэрлэх талаар гэдэвэр хэрэгжүүлсэн. Гэвч НАОБТ-ын хэрэгжүүлсэн дэхиш ажлаас гарч хэмжээний технологийг зөвхө сүрьеа, ажлыг хүлээлжээ өгөх процесс хангалтгүйн улмаас Монгол тал дутагдлаа бие даан хэмжээл хийх чадмаггүй болсон.

6.1 Цаашдын хэрэгжилтэнд тавигдах шаардлага (3)
Инвентор, тархалтын загварчлалын асуудал

Асуудал	Шаардлага
НАОБТГ-ын хариуцсан мэргэжилтэнд 2021-2022 оны 3 сар хүртэл инвентор, тархалтын загварчлалын технологи эзэмшүүлэх ажил дахин хийгдсэн. Төслийн 1, 2, 3-р үе шатанд хариуцсан хүн ажлаас гарах, солигдох үед тооцоолох техникийн чадвар, ноу-хаут өндүүлэх мэргэжилтэн тухай бүрт дахин сургалт хийж чадаажуулж ирсэн.	НАОБТГ-аас зөвхөн файл, материалыг хүлээлгэн өгөх бус шаардлагатай ноу-хаут ажлын өгөгдлийн талаарх ялгарлыг зэрэг)-ыг ажиллагааг зохицуулах зэрэг)-ыг ажлаас сургалт, тасралтгүй хүргэхийг шаардаж байна.

5. Япон талын санхүүг хэлэлцэж, эгнээн байлгах

5.1 ТГМ-ын байгууллагын нэршил өөрчлөх

□ Нийслэлийн байгууллагын нэрийн өөрчлөлт

- Нийслэлийн Засаг даргын 2021 оны 12 дугаар сарын 28-ны өдрийн А/1037 тоот захирамжаар Агаарын бохирдолтой тэмцэх газар (НАОБТГ)-ыг Агаар, орчны бохирдолтой тэмцэх газар (НАОБТГ) болгон өөрчилсөн тул ТГМ-ын НАОБТГ-ыг НАОБТГ болгон өөрчлөх.

Анхаарал хандуулсанд баярлалаа

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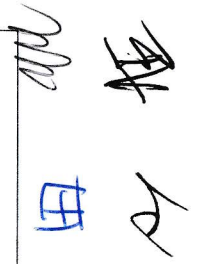
Project Design Matrix (PDM)

Ver.1.6

Dated: June 9, 2022

Project Title: Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3**Implementing Agency:** Department of Against Air and Environmental Pollution (DAAEP) of Ulaanbaatar (UB) City, Ministry of Environment and Tourism (MET) and Counterpart Working Group (C/P-WG)**Target Group:** DAAEP, MET, C/P-WG and Relevant Agencies**Duration of the Project:** November 2018 – July 2024 (5 years and 9 months)**Project Site :** UB City

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Emission reduction at major emission sources is enhanced towards air quality improvement in Ulaanbaatar City.	1. XX% of emissions from major pollution sources is reduced compared with the BAU baseline.	1. Comparison between BAU and updated inventory for target year (3 to 5 years after completion of the Project)	
Project Purpose Capacity for air pollution control in Ulaanbaatar City is strengthened, paying special attentions to implementation of effective pollution control measures and to the necessary coordinating mechanism of DAAEP and the relevant agencies.	1. One of pilot projects are adopted as full scale implementation by relevant authorities. 2. At least one case of lessons learned from the pilot projects are utilized by the decision makers. 3. Relevant laws, regulations and standards on air pollution control measures are implemented in UB City. (At least establishment of one MNS, and/or 70% of compliance in the dust emission standards of existing MNS; MNS5043:2016 (General technical requirement of heat water boiler under 4.2MW) and MNS5919:2008 (Emission limit value and measurement method of power plant, steam boiler))	1. The Project reports 2. Interview survey to the relevant agencies 3. Laws, regulations, MNS standards, and ordinances of UB City	
Outputs			
Output 1: Capabilities of emission monitoring for the major pollution sources and of air quality monitoring are strengthened.	1-1. During the Project duration, at least 50 % of inspections for boiler registration based on emission measurements (including standard and simplified methodologies) are implemented by DAAEP and IACC. 1-2. The emission measurement reports are submitted to Project Leader of UB city in charge of air and environmental pollution at least 3 times during the Project duration. 1-3. Emission monitoring for the major pollution sources and air quality monitoring information are shared regularly among the relevant agencies through coordination between DAAEP and NAMEM. 1-4. The CEMS measurement is compared with the standard measurement once in a year. 1-5. Distribution of emission measurements from vehicles in UB City is prepared based on the study with RSD at least once a year.	1.Emission measurement reports by DAAEP / IACC 2.The Project reports 3.Boiler registration database 4. Air quality monitoring monthly reports and annual reports 5. CEMS data	1. Legal and political framework for air quality management is maintained, which defines decision making mechanism such as NCEPR and professional agencies like DAAEP and NAMEM. 2. The COVID-19 pandemic situation will be improved and JICA will be able to send JICA Experts to Mongolia toward April 2021 until the end of the Project.
Output 2: Capabilities to analyze and evaluate pollution structure of PM, SO ₂ , and NO _x throughout the year are strengthened.	2-1. The results of PM apportionment study are reported at least three times during the Project. 2-2. Pollution structures are assessed at least 3 times during the Project duration including emission inventory, simulation model, PM speciation, receptor model, air quality monitoring and population exposure throughout the year.	1. The Project reports	
Output 3: Capabilities of technical evaluation and preparation of air pollution control measures for implementation are strengthened.	3-1. Drafts of emission measurement methods and quality standards of improved fuel for households in Ger area are submitted to MASM. 3-2. At least three of implementation plans of the pilot projects are prepared.	1. The Project reports	

Output 4: Decision making process for air pollution control is improved by utilizing the Professional agencies including DAAEP, NAMEM and the relevant agencies.	4-1. Analysis of air pollution status, short-, medium- and long- term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned) are presented to decision makers at least 2 times. 4-2. Results of pilot project implementation and other Project results are utilized for the revision of NCEPR and for decision making on implementation/non-implementation of pollution control measures at least once.	1. The Project reports 2. Reports on NPREP	
Output 5: Air pollution control measures are enhanced for PM, SO ₂ and NO _x emission reduction at major sources.	5-1. At least three pilot projects selected by C/P-WG are implemented 5-2. The results of each pilot project (emission reduction, improvement of ambient air quality and population exposure for PM, SO ₂ and NO _x) are presented to the relevant agencies.	1. The Project reports	
Output 6: Legal framework, resource allocation and coordinating mechanism as a Platform for the Air Quality Management Cycle are strengthened for the Outputs 1 to 5.	6-1. At least three of drafts on laws and regulations, such as fuel regulations, MNS emission standards and ordinances of UB City, are submitted. 6-2. More than 3 air pollution control measures and technologies are funded by the sections of the relevant agencies in charge of allocating funds for air pollution control by utilizing technical appraisal guideline provided by the Project. 6-3. At least three agreements are made on demarcation of roles of the relevant agencies for air pollution control measures in the Project. 6-4. The operational guideline is distributed to relevant agencies.	1. Laws and regulations, fuel regulations, MNS emission standards and ordinances of UB City 2. Minutes of Meeting of NCEPR 3. Official documents including UB city Governor's orders 4. Operational guideline	

Activities	Inputs	
1-1 1-1 DAAEP and IACC reinforce HOB inspections based on on-site stack gas measurements. 1-1-1 DAAEP and JICA Experts assess the technical transfer on-site stack gas measurement. 1-1-2 DAAEP with JICA Experts re-constructs 2 teams of stack gas measurement. 1-1-3 IACC and the relevant agencies with JICA Experts implement HOB inspection based on on-site stack gas measurement. 1-1-4 IACC with JICA Experts introduces simplified measurement method by using IACC's portable gas measurement equipment including parallel measurement with JIS method, elaboration of manuals and manufacturer's calibration. 1-1-5 DAAEP and IACC with JICA Experts elaborate emission measurement reports. 1-1 1-2 TPP3 and TPP4 with JICA Experts enhance emission gas control by utilizing CEMS. 1-2-1 TPP3 and TPP4 with JICA Experts elaborate and implement CEMS operation and maintenance plan. 1-2-2 TPP3 and TPP4 with JICA Experts perform quality control of emission gas data of CEMS. 1-2-3 TPP3 with MET and the relevant agencies elaborates online emission data reporting system for the CEMS. 1-2-4 NAMEM and the relevant agencies share and evaluate CEMS emission data. 1-2-5 NAMEM compiles monitoring data of emissions from TPP2, TPP3, TPP4 and new large heat supply facilities and share them with relevant agencies. 1-3 MRTD and PTSD introduce relevant regulations of vehicles based on emission measurement. 1-3-1 MRTD and PTSD with JICA Experts implement vehicle emission measurements by RSD, assess distribution of vehicles emission intensity and define target vehicles to be regulated. 1-3-2 MRPA and IACC with JICA Experts implement automobile fuel surveys. 1-3-3 JICA Experts conduct training to NRTC, in addition to DAAEP, on vehicle emission measurement using on-board emission measurement system, and DAAEP and NRTC implement vehicle emission measurement using on-board emission measurement system.	Japanese side 1. JICA experts (necessary fields) (1) Chief Advisor (2) Air Pollution Control Planning and Policy (3) Emission Measurement for Stationary Sources (4) Ambient Air Quality Monitoring (5) Ambient Air Quality Analysis (6) PM10 and PM2.5 Sampling (7) PM10 and PM2.5 Apportionment Study (8) Emission Inventory (Stationary, Mobile and Others) (9) Air Quality Simulation Modeling / Air Pollution Control Measures Evaluation Mongolian side 1. C/P and C/P-WG (1) JCC Chairperson (2) JCC Vice-Chairperson (3) Project Director (4) Project Manager (5) Necessary C/P and C/P-WG staff according to the fields of JICA Experts 2. Facility (1) Provision of necessary office space in DAAEP and MET (including internet access) (2) CLEM Laboratory (3) Storage Space for Equipment 3. Local cost (1) Counterpart expenses such as salary, allowance,	1. There are no frequent leaves, transfers or resignations of C/P and C/P-WG members. 2. Necessary coordination among UB city, districts, khoroos and communities in Ger area is secured by Mongolian side for implementation of pilot projects.

1-3-4 Public Transportation Service Department of the Capital City with JICA Expert transfer the DPF which were installed on 24 large buses by the project "Verification Survey with the Private Sector for Disseminating Japanese Technologies for Emission Reduction of Particulate Matter (PM) from Diesel Buses by DPF" to other buses. 1-4 DAAEP and NAMEM with JICA Experts strengthen AQMS utilization. 1-4-1 CLEM and JICA Experts assess the current status of equipment in reference laboratory of CLEM and identify necessary actions if necessary. 1-4-2 DAAEP reinforces AQMS operation and maintenance based on the plan by Phase 2. 1-4-3 DAAEP with JICA Experts starts air quality monitoring at pilot project area for improved household fuels by utilizing mobile AQMS. 1-4-4 DAAEP with JICA Experts reinforces the AQMS at Bayankhosuu station. 1-4-5 DAAEP and NAMEM with JICA Experts implement parallel measurement by FRM sampler for PM concentration, and implement quality control of PM measurements of AQMS. 1-4-6 DAAEP and NAMEM with JICA Experts maintain the online information system of AQMS. 1-4-7 DAAEP and NAMEN share real-time monitoring data with the relevant agencies through the online information system. 1-4-8 DAAEP and CLEM with JICA Experts analyze air quality monitoring data and elaborate air quality monitoring reports. 1-4-9 The relevant agencies utilize air quality monitoring data. 1-4-10 DAAEP with JICA Experts establishes the data transfer system of air quality monitoring data of Dambadarjaa station to the online information system of AQMS. 2-1 NAMEM and JICA Experts conduct PM apportionment study based on PM speciation throughout the year. 2-1-1 CLEM and JICA Experts elaborate PM sampling plan throughout the year, and implement PM samplings. 2-1-2 JICA Experts perform PM speciation analysis in Japan. 2-1-3 NAMEM and CLEM with JICA Experts learn PM speciation technologies (ion analysis, element analysis and carbon analysis). 2-1-4 NAMEM and CLEM with JICA Experts formulate equipment and laboratory plan for PM speciation. 2-1-5 DAAEP and NAMEM with JICA Experts perform PM apportionment study based on receptor modeling. 2-2 DAAEP and NAMEM with JICA Experts evaluate air pollution structure and health impact based on air quality simulation model and receptor model. 2-2-1 DAAEP and NAMEM elaborate plans for updating emission inventory. 2-2-2 DAAEP, TCC and PTSD implement studies for mobile sources including update of emission inventory, examination of traffic signal control, traffic volume and vehicle traveling speed. 2-2-3 DAAEP and JICA Experts select the pilot areas and assess Ger stoves usage pattern (type and model of stoves, seasonal pattern of usage, insulation of Ger housing and coal consumption). 2-2-4 DAAEP and NAMEM with JICA Experts implement studies for other emission sources as necessary. 2-2-5 DAAEP and NAMEM with JICA Experts elaborates BAU (Business as usual) scenario for the future year based on TPPs future development plans, projection of number of vehicle, population, economic growth, emission regulation, fuel quality regulation and so on. 2-2-6 DAAEP and NAMEM update emission inventory for the present year and the future year for the BAU scenario. 2-2-7 DAAEP and NAMEM update the air quality simulation model for PM10, SO₂ and NO_x. 2-2-8 DAAEP and NAMEM evaluate the air pollution structure of UB city. 2-2-9 DAAEP and NAMEM evaluate indicative population exposure of PM10 based on population weighted concentration and so on. 3-1 DAAEP and the relevant agencies elaborate a draft MNS on an emission measurement method of improved fuel and fuel quality, and propose it to MASM. 3-2 ME with JICA Experts elaborates safety standards on the household gas distribution. 3-3 DAAEP and the relevant agencies elaborate implementation plans and terms of reference for pilot projects such as improved fuel, HOB, traffic signal control, eco-driving, RSD, smoke belching program based on portable emission device, DPF, low sulfur fuel and low emission vehicles.	(10) Auto-mobile Emission Control 1 (Traffic Signal Control) (11) Auto-mobile Emission Control 2 (RSD and others) / Emission Measurement 2 (12) Clean Coal Technology for Air Pollution Control Measures (13) CEMS Data Analysis (14) Stationary Source Emission Control Measures (15) Air Quality Administration (16) Public Awareness and Public Relations 2. Training (1) Local seminars and workshops (2) Training course in Japan 3. Provision of necessary equipment 4. Local cost Necessary expenses for activity of JICA Experts travel cost and accommodation (2)Project administrative expenses
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4-1 DAAEP and NAMEM submit to the decision makers the analysis of air pollution status, short-, medium- and long-term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned) . 4-2 Relevant agencies with pilot projects elaborate technical guidelines and utilizes them. 4-3 The relevant agencies discuss and endorse the selection of pilot projects. 4-4 NCEPR and the relevant agencies approve large scale investments based on pilot projects implementation and assessment. 4-5 NCEPR, or the sections of the relevant agencies in charge of allocating funds for air pollution control in the Mongolian government such as the Environment and Climate Fund utilizes the Outputs of the Projects and pilot projects implementation and assessment.		
5-1 DAAEP with Health Department of Capital City and the relevant agencies implements public awareness and advisory activities for citizens including school students and parents. 5-2 MET and DAAEP publish progress of the Project by newsletter, newspaper articles, web-site and other medias. 5-3 DAAEP and JICA Experts provide technical guidance to manufacturers for improved fuel production. 5-4 The relevant agencies with JICA Experts implement pilot projects according to the implementation plan by Activity 3-3. 5-5 The relevant agencies with JICA Experts evaluate pilot projects results in terms of emission reduction, air quality improvement and exposure to citizens, and extract lessons learned. 5-6 The relevant agencies with JICA Experts report the pilot projects results to NCEPR. 5-7 TPP3 and TPP4 analyze CEMS data, and examine viable air pollution control measures. 5-8 TPP3 and TPP4 with JICA Experts elaborate emission reduction plans.		Pre-conditions 1. Appropriate number of qualified staff of C/P and C/P-WG is assigned. 2. Adequate amount of budget related with the Project implementation is secured. 3. Necessary human resources mobilization related with pilot projects is secured by Mongolian side.
6-1 The relevant agencies discuss and elaborate written agreements on demarcation of roles in air quality management related with each Output and Activity of the Project. 6-2 DAAEP with JICA Experts submits technical documents to NCEPR for improved fuel standard, emission standard on stationary sources, mobile sources and other emission sources, and revision of ordinance. 6-3 NCEPR and the relevant agencies elaborate fuel standard and emission standard, and submit them to MASM. 6-4 Relevant ministries / relevant agencies of UB city elaborate laws, regulations and ordinances on air pollution control measures, and submit them to national parliament / city council. 6-5 JICA Experts provide training on air pollution control measures and technical appraisal guidelines for staff of the sections of the relevant agencies in charge of allocating funds for air pollution control. 6-6 Staff of the sections of the relevant agencies in charge of allocating funds for air pollution control with JICA Experts improve relevant operations with allocating funds for air pollution control measures, if necessary. 6-7 Mongolian side enhances donor coordination in air pollution control. 6-8 Relevant agencies of pilot projects with JICA Experts develop an operational guideline for elaboration, implementation and evaluation of air pollution control measures based on pilot projects implementation.		

AQMS: Air Quality Monitoring Station

BAU: Business as Usual

CEMS: Continuous Emission Monitoring System

CFWH: Coal Fired Water Heater

C/P: Counterpart

C/P-WG: Counterpart Working Group

DAAEP: Department of Against Air and Environmental Pollution of Capital City

DPF: Diesel Particulate Filter

FRM: Federal Reference Method

HOB: Heat Only Boiler

IACC: Inspection Agency of the Capital City

MASM: Mongolian Agency for Standardization and Metrology

MET: Ministry of Environment and Tourism

MMHI: Ministry of Mining and Heavy Industry

MNS: Mongolian National Standard

MRPA: Mineral Resources and Petroleum Authority
MRTD: Ministry of Road and Transport Development
NAMEM: National Agency for Meteorology and Environment Monitoring
NCEPR: National Committee for Environment Pollution Reduction

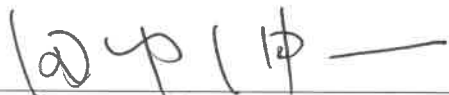
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MINUTES OF MEETING OF
THE EIGHTH JOINT COORDINATING COMMITTEE MEETING
ON JAPANESE TECHNICAL COOPERATION FOR
CAPACITY DEVELOPMENT PROJECT FOR AIR POLLUTION CONTROL IN
ULAANBAATAR CITY PHASE 3 in MONGOLIA

The Japan International Cooperation Agency (hereinafter referred to as “JICA”) Supervisory Team for “Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3 in Mongolia (hereinafter referred to as “the Project”), JICA Mongolia Office, and JICA Expert Team (hereinafter referred to as “JET”) had a series of meetings with Department of Against Air and Environmental Pollution of Capital City (hereinafter referred to as “DAAEP”), Ministry of Environment and Tourism (hereinafter referred to as “MET”) and Joint Coordinating Committee (hereinafter referred to as “JCC”) members from 21st November to 14th December 2022 to discuss the Monitoring Sheet No.8, and held the seventh Counterpart Working Group (hereinafter referred to as “C/P-WG”) meeting in hybrid format on 6th December and the eighth JCC meeting of the Project chaired by Mr. Tumurtumuu ZUNDUI, Deputy Governor of Capital City in Charge of Social Sector, Green Development and Air and Environmental Pollution in hybrid format on 9th December 2022. Participants list of the eighth JCC meeting is shown in Annex I.

Japanese side and the Mongolian authorities had a series of discussions. As a result of discussions, both sides agreed on matters referred to the document attached hereto.

Ulaanbaatar, 14th December 2022


Mr. Shinichi TANAKA
Chief Representative
JICA Mongolia Office
Japan International Cooperation Agency,
Japan,


Mr. Tumurtumuu ZUNDUI
Deputy Governor of Capital City
in Charge of Social Sector, Green
Development and Air and
Environmental Pollution


Mr. Toru TABATA
Leader, JICA Expert Team, Japan


Mr. Choigunsen CHIMIDSUREN
Director General
Development Financing and Public
Investment Department
Ministry of Finance, Mongolia

ATTACHED DOCUMENT

I. Project Monitoring Sheet 8

JET explained the progress of the Project, future activity plan, and issues that the Project is facing since its beginning. After active discussions, the JCC approved Project Monitoring Sheet 8.

II. Revision of the Project Design Matrix

1. Project Design Matrix (Revision of Organization Name)

The Japanese side proposed the revision of the Project Design Matrix (hereinafter referred to as PDM), which was approved by the Mongolian side. The revised contents in the PDM are indicated in Annex II.7

III. JCC Chairperson

At the 2nd JCC on 7th June 2019, JCC Chairperson of the Project, Deputy Governor of Capital City in charge of Air Pollution Reducing and Green Development, was changed to Project Leader in charge of Air Pollution Reducing and Green Development in accordance with Mayoral Order 100th (21st March 2019). Deputy Governor of Capital City in Charge of Human Development and Social Policy was changed to Deputy Governor of Capital City in Charge of Social Sector, Green Development and Air and Environmental Pollution in accordance with the Mayoral Order B/86 (8th June 2022). The position of the Project Leader was abolished. Therefore the Japanese and Mongolian sides approved that JCC Chairperson was changed from the Project Leader of Capital City in Charge of Air and Environmental Pollution to Deputy Governor of Capital City in Charge of Social Sector, Green Development and Air and Environmental Pollution.

IV. Project Director

The Japanese and Mongolian sides agreed that Director in DAAEP was assigned as Project Director as described in the Record of Discussions on 29th June 2018 although the JCC approved that a Head of Policy Implementation Division in DAAEP, was assigned as acting Project Director at the 4th JCC on 28th January 2021.

V. Demand from the Japanese side of the issues on the future project activities

1. Demand for securing human resources and succession of duties necessary for the project

Japanese side demanded to issue an agreement on the role among the relevant agencies (DAAEP, National Agency for Meteorology and Environment Monitoring (hereinafter referred to as "NAMEM"), and Information and Research Institute of Meteorology,

Hydrology and Environment (hereinafter referred to as “IRIMHE”) sharing in developing emission inventories, implementing air quality simulation, and assessing air pollution control measures at the 6th JCC on December 2021. However, the agreement on the roles among the relevant agencies has not yet been issued because persons in charge of the air quality simulation has retired and there are no personnel available, and the organization in charge of the air quality simulation has not yet been decided. Therefore, the JET demanded the Mongolian side to include the option of contracting the work to universities or private companies if the personnel of the relevant agencies are unable to implement the simulation and analyze results of air quality simulations (Activities 2-2-7~2-2-9).

Mr. Batbayar JADAMBA of NAMEM responded that the lack of institution and technology transfer personnel to implement the simulations on the Mongolian side is an issue, since NAMEM is a government agency, there is a lack of human resources capable of conducting the air quality simulation and other technical work. It is considered that the air quality simulation should be implemented by specialized institutions such as research institutes and universities. Similarly in Japan, the Ministry of the Environment outsources air quality simulations and analyses to private companies.

Mr. Munkhbat TSENDEEKHUU of MET responded that a comparison of an air quality simulation results for 2018 and 2020 was reported by JET, which was an important resource for planning long-term policies. The Mongolian side fully understands the importance of maintaining this technology. Since government agencies were unable to secure human resources due to frequent personnel transfers and retirements, he considered that the best solution for the Mongolian side to implement technical activities will be to transfer and outsource the technology to universities and other institutions that are researching simulation models. MET will fully support the university that is assigned to implement the air quality simulation. There is a budget package for air pollution reduction from the MET Minister. From this package, a budget could be generated for commissioning air quality simulation each year. It is also possible to budget for the implementation of air quality simulation as part of the MET's medium-term studies to be conducted. Regarding technology transfer, the Department of Applied Sciences at the National University of Mongolia and the Mongolian University of Science and Technology are studying air quality simulation models. During December 2022, the Mongolian side will explain the outline of the air quality simulation to professors at the target universities and ask their opinions about the outsourcing. A mid-term policy of the MET is to add a class on air quality simulation models to the university curriculum in order to in order to secure human resources in the future.

2. Demand for Popularization of low-sulfur fuel

The Mongolian Government decided to amend the Air Law dated April 22, 2022 by adding a stipulation in Article 16.1.6 to provide retail and sale of the highest grade fuel of Mongolian National Standards (hereinafter referred to as “MNS”) and to prohibit the

retail and sale, etc. of lower grade fuel in Air Quality Improvement Area of Ulaanbaatar City. However, EURO 2 fuel, which contains high sulfur concentration, is still available for sale and is still used in public buses. In addition, public buses are gradually being introduced to comply with the EURO V regulations, which require low-sulfur fuel (EURO 5), but some public buses have reported that engine failures have occurred due to the use of EURO 2 fuel, and similar failures are likely to occur in other buses in the future. Therefore, the Japanese side demanded the following items to the ministries and agencies involved in automobile fuel;

- (1) Prohibition of the sale and use of EURO 2 fuel in Ulaanbaatar
- (2) Correction of the price increase of low-sulfur fuel against EURO 2 fuel (through the use of special taxes, etc.)
- (3) Public relations activities regarding the possibility of malfunctions of vehicles comply with emission regulations above EURO V due to the use of EURO 2 fuel.
- (4) Public relations activities regarding the proper maintenance of DPFs, etc. for vehicles comply with EURO V and higher emission regulations.

Mr. Munkhbat TSENDEEKHUU of MET responded that the current issue is to secure the import volume of EURO 5 fuel. Once the import volume is secured, it is planned to proceed with its implementing regulations and legal coordination.

Mr. Khishigdalai CHULUUN of Ministry of Mining and Heavy Industry, Fuel Policy Department (hereinafter referred to as "MMHI") responded that nine hundred thousand tons of diesel fuel is imported into Mongolia per year, of which 10% are EURO 5 fuel. Most of this is sold to industrial business, so the amount of EURO 5 fuel sold in Ulaanbaatar city is limited. Currently, the government is offering exemptions of taxes on vehicles fuels in order to sell them at lower prices. In the future, after the fuel import situation improves and fuel import prices drop, the government is considering introducing a special tax to eliminate the difference in fuel sales prices. Ulaanbaatar city purchased 60 EURO V buses this year, but 60 new EURO V buses may be failure and broken because bus companies under Ulaanbaatar City jurisdiction have not used EURO 5 fuel. He demanded Ulaanbaatar City and the Project to include an awareness campaign for improving awareness regarding introduction of EURO 5 fuel. I also demand Ulaanbaatar City that Mayoral Order and Ulaanbaatar City Council Order be issued regarding the obligation to use Euro 5 fuel for EURO V buses under Ulaanbaatar City jurisdiction.

Mr. Atsushi SATO of JET responded that JET will conduct public awareness activities where EURO5 fuel must be used. Also JET will discuss with Mongolian side the best way to cooperate with them in the future regarding public awareness activities.

3. Demand for transfer of Diesel Particulate Filters (hereinafter referred to as "DPFs") Diesel Particulate Filters (hereinafter referred to as "DPFs") have been installed in 24 large buses under the project "Verification Survey with the Private Sector for Disseminating Japanese Technologies for Emission Reduction of Particulate Matter

(hereinafter referred to as “PM”) from Diesel Buses by DPFs”. The DPFs equipment has been handed over to Public Transportation Department of the Ulaanbaatar City (hereinafter referred to as “PTD”). Transfer of DPFs equipment is an additional activity requested by the PTD. The PTD assessed the condition of the DPFs equipment and coordinated with the bus companies. However, some of the DPFs equipment was unusable due to poor storage conditions, and additional costs were involved in the cleaning and transportation of the DPFs equipment. The PTD has begun selecting bus companies to which the DPFs equipment will be relocated, but because the cost of personnel and supplies to maintain and manage the DPFs equipment is a defrayment for the bus companies, the DPFs equipment relocation work has not progressed with the exception of a bus company. In addition, even if the DPFs equipment is transferred this time, there is an issue that DPFs equipment will no longer be used in a few years, so it is necessary to establish a system of operational method for continuous utilization of DPFs equipment. Therefore, the Japanese side demanded the following to the PTD;

- (1) Proper management and storage of DPFs equipment until the DPFs equipment is relocated
- (2) Operational support for bus companies that have relocated their DPFs equipment, including operational costs
- (3) Establishment of public benefits (e.g., tax exemption) for bus companies that have relocated DPFs equipment
- (4) When a bus company that has relocated its DPFs equipment reaches the end of its service life, provide for the cost of relocating the DPFs equipment to the next bus and support the relocation.

VI. Request based on the Previously conducted JCCs

1. Establishment of a forum to discuss household improved fuel

JET considers that there is not enough opportunity to discuss results of the pilot project of household improved fuel and cost-effectiveness of household improved fuel only in the JCC meeting and C/P-WG meeting.

The Japanese side requested that:

- (1) An expert meeting on improved fuel will be held to consult the Mongolian side's opinion on improved fuels in the pilot project.
- (2) A meeting will be held with higher level decision-makers such as National Committee for Environmental Pollution Reduction (hereinafter referred to as “NCEPR”) to report results of the pilot project and its cost-effectiveness in order to propose household improved fuels to the Mongolian government.

Mr. Galymbek KHALTAI of Tavan Tolgoi Tulsh LLC (hereinafter referred to as “TTT”) mentioned that the Minutes of Council of Government Ministers No. 25, dated April 27, 2022 mandated that the quality of improved fuel of TTT should be improved and emitted Sulfur Dioxides (hereinafter referred to as “SO₂”) concentrations of the improved fuel of

TTT should be reduced during combustion. On 15th December 2022, TTT and DAAEP will hold a consultation meeting on "The Way to Improve the Quality of Improved Fuel of TTT" with the participation of relevant organizations. In this consultation, technical discussions will be held on ways to improve the current improved fuel of TTT. The results of the consultations will be reported to the Council of Government Ministers. He recommended that it would be a good idea for JET to participate in this consultative meeting and make a presentation.

Mr. Toru TABATA of JET responded that JET will consider joining the consultation and making a presentation.

VII. Comment from Mr. Tumurtumuu ZUNDUI, JCC Chairperson

I regret that the Mongolian side does not fully understand the goals and policies of the project, and the importance of the activities to reducing air pollution in Ulaanbaatar City. In particular, there is a lack of positive action and leadership on the part of the Mongolian side regarding the implementation of activities and expected results. For example, with regard to the bus companies that have been an issue, solutions should be discussed at the city level to implement the activities. In order to achieve the results of the project in the future, I would like the Mongolian side to be more aware of their ownership of the project than before. Ulaanbaatar City will report to the National Committee for Environmental Pollution Reduction (hereinafter referred to as "NCEPR") and the government. In terms of project implementation, I feel that the individual efforts of the experts in charge of the activities and the C/P-WG, as well as their ability to communicate with each other, are insufficient. I am sure there are shortcomings on the Mongolian side as well. JET are encouraged to consult with me directly on which activities C/P-WG agencies are facing challenges and the way to achieve results in the future. If the efforts of the previous staff and agencies in charge are insufficient, they are able to be changed. I am dissatisfied because of many inadequacies in achieving the expected results. As deputy mayor, I am in charge of various fields and it is difficult for me to be involved in all of them, but I would like to be proactive.

VIII. Other Comments from the Mongolian side

Mr. Davaajargal GAN-OCHIR of DAAEP mentioned that DAAEP conducts HOBs emission measurements every winter; DAAEP alone is currently unable to conduct HOBs emission measurements at all facilities in one winter. A working group of the NCEPR is discussing an inspection of HOBs based on emission measurements. The working group is considering the installation of Continuous Emission Measurement System (hereinafter referred to as "CEMS") installed in thermal power plants from the viewpoint that it is important to monitor HOBs emissions constantly in the future. He requested the Japanese side to provide CEMS on a pilot basis for this project and to introduce the methodology

regarding inspection of HOB of Japan. In Mongolia, HOBs emission measurements are conducted from November to March, when the HOB load is above 70%. The implementation duration is short. Based on this situation in Mongolia, he requested to JET to advice on a solution to conduct HOBs emission measurements only in one winter. Mr. Natsuji SAWAKI responded that emission measurements of boilers in Japan are conducted by private companies once every two months under the Air Pollution Control Law, as the same method conducted by the DAAEP. There are no plans to provide CEMS in the project. CEMS is very expensive, and the CEMS was provided the thermal power plant No.4 in the Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 2 in Mongolia, and CEMS cost was more than 40 million yen. Since there are many HOBs in Ulaanbaatar, he suggested that it might be better to increase the number of measuring agencies than to introduce CEMS. Considering DAAEP's personnel and equipment, he suggested that the frequency of inspection of all HOBs based on emission measurements is changed to once every two years instead of once a year.

END

ANNEX I Participants of Eighth Joint Coordination Committee

ANNEX II Monitoring Sheet No.8, Revised Activity Plan and Important Issue

ANNEX III PDM (ver. 1.7)

ANNEX I Participants of Eighth Joint Coordination Committee

	Name	Organization	Position
1	Mr. Tumurtumuu ZUNDUI	Ulaanbaatar City	Deputy Governor of Capital City in Charge of Social Sector, Green Development and Air and Environmental Pollution
2	Mr. Khishigdalai CHULUUN	Ministry of Mining and Heavy Industry, Fuel Policy Department	Head of Department
3	Mr. Khavidolda SHOLTAI.	Ministry of Road and Transport Development, Traffic Coordination Department	Head of Department
4	Mr. Bayasgalan BATSAIKHAN	Ministry of Road and Transport Development, Policy and Planning Department	Officer
5	Ms. Bolormaa DARKHIJAV	Ministry of Construction and Urban Development, Policy and Planning Department	Officer
6	Mr. Altanzul BASSANJAV	Secretariat of the National Committee for Environmental Pollution Reduction	Secretary- general
7	Mr. Munkhbat TSENDEEKHUU	Ministry of Environment and Tourism, Environment and Natural Resources Management Department,	Officer
8	Mr. Batbayar JADAMBA	National Agency for Meteorology and Environment Monitoring Environment Monitoring Division	Head of Division
9	Ms. Gerelmaa BAATARKHUU	Ministry of Finance Development Financing Development Department	Officer
10	Ms. Nyamtseveen TSERENDAGVA	Mayor's office Development, Urban Engineering Facility Division	Head of Division
11	Ms. Enkhtugsmaa JAMSRAN.	Mayor's office Development, Urban Development Planning Division	Officer
12	Mr. Batsuuri CHULUUNBAT	Public Transport Department, Technical Division	Head of Division
13	Ms. Narangerel NAMSRAI	Inspection Agency of the Capital City, Division of Air Quality Control	Head of Division
14	Mr. Amartuvshin GALBADRAKH	Urban Regulation, Environmental Safety Control Coordination Department Environmental Safety Control Division	Officer
15	Mr. Ganbold TSOG	Department of Against Air and Environmental Pollution of the Capital City	Head of DAAEP
16	Mr. Davaajargal GAN-OCHIR	Department of Against Air and Environmental Pollution of the Capital City, Air Quality Management Division	Head of Division
17	Ms. Byambatsetseg ENKHBAT	Department of Against Air and Environmental Pollution of the Capital City, Policy Implementation Division	Officer
18	Mr. Galymbek KHALTAI	Tavan Tolgoi Tulsh LLC	General technologist
19	Ms. Burenjargal BAASANDORJ	Thermal Power Plant No.4, Industrial Ecology Management	Engineer

		Division	
20	Mr. Shinichi TANAKA	JICA Mongolia Office	Chief Representative
21	Mr. Atsuki TAKEDA	JICA Mongolia Office	Project Formulation Advisor
22	Ms. Oyuntsetseg.CH	JICA Mongolia Office	National Staff
23	Mr. Toru TABATA	JICA Expert Team	Chief Advisor
24	Mr. Natsuji SAWAKI	JICA Expert Team	Sub Leader
25	Mr. Atsushi SATO	JICA Expert Team	Group Leader of Auto-mobile Countermeasure
26	Mr. Hajime Endo	JICA Expert Team	Clean Coal Technology / Pilot Project for Improved Fuel 1
27	Mr. Shinya NAKATA	JICA Expert Team	Air Quality Simulation Model / Air Pollution Control Measures Evaluation / Emission Inventory

ANNEX II Presentation of Monitoring Sheet and Important Issue

Монгол улс Улаанбаатар хотын агаарын бохирдлын
хяналтын чадавхыг бэхжүүлэх төсөл
(3 дугаар үе шат)
ХЗХ-ны 8 дугаар хуралдаан

2022 оны 12 сар
ЖАЙКА төслийн баг

1

ХЗХ-ны 8 дугаар хурлын зорилго

1. Гүйцэтгэлийн тайлан /Дугаар-8/-г батлах (2022/05-2022/10)
2. Тулгамдсан асуудал болон ХЗХ-ны 8 дугаар хуралдаанаар хэлэлцүүлэх асуудал
 - 2.1 Цаашид тулгамдаж буй асуудалтай холбоотой шаардлага
3. Япон талын саналыг монгол талтай хэлэлцэж, эцэслэн батлах
 - 3.1 Төсөл төлөвлөлтийн матриц (ТТМ)-д ХЗХ-ны дарга болон төслийн захирлын томилоог өөрчлөх

2

ХЗХ-ны 8 дугаар хурлын зорилго

1. Гүйцэтгэлийн тайлан /Дугаар-8/-г батлах (2022/05-2022/10)

3

1. Гүйцэтгэлийн тайлан /Дугаар-8/ тойм (2022/05-2022/10)

4

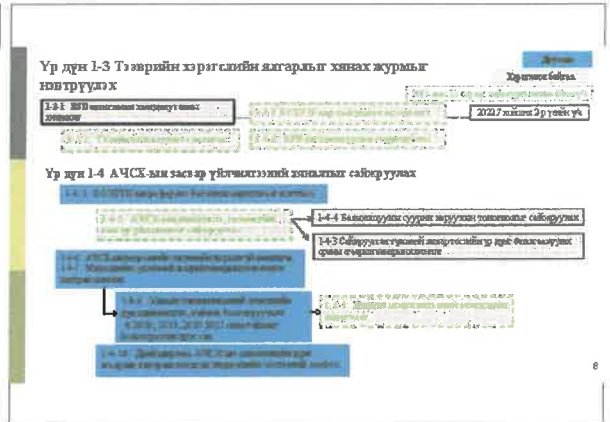
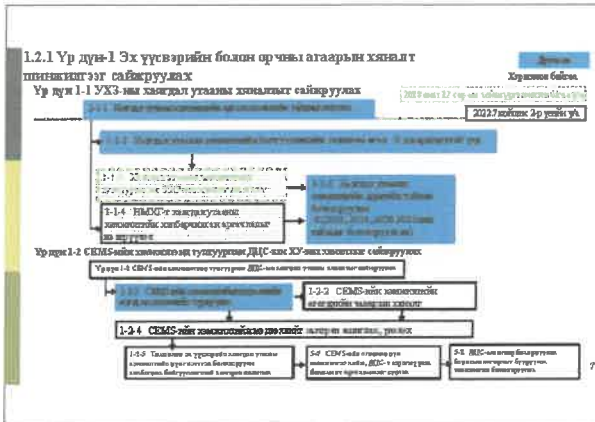
1.1 ХЗХ болон Х/Т-АХ-ийн хуралдаан

- 2022 оны 6-р сарын 6-нд Х/Т-АХ-ийн 6-р хуралдаан, 2022 оны 6-р сарын 9-нд ХЗХ-ны 7-р хуралдааныг тус бүр онлайнаар зохион байгуулсан
 - НАБТГ-ийн НАОБТГ болж өөрчлөгдсөн тул ТТМ-д өөрчлөлт (ver. 6) оруулсан.
 - DPF-ийг нийлжүүлэн суурьшуулж дэмжлэг үзүүлэх /Монгол талын хүсэлт/ хүргэнэ. НТГ-г хангаж DPF-ийг нийлжүүлэх суурьшуулж бэлтгэх (сонгог төхөөрөмжийн ажиллагааг шалгах, шилжүүлэн суурьшуулж ААНБ-ийг тогтоох, цаашид DPF ашигласнаар дэмжлэг үзүүлэх) -ийг хангаж ажиллахыг үүссэн.
 - Хармундсан ажилтан ажиллаж гарах, солигдох үед ажлын хүлээлцэж, технологийн ур чадавхыг өсгүүлэх ажил хийгээдтгүй
- Ялагшув, инвентор, тархалтын загварчлалтай ажиллах мэдлэг, чадааныг тусгай бүрт дахин эмхцэн шалгалтаа гарч байгааг анхаарч, эмхцэн файн, материал хамжуулах бус өгөгдөл цуглуулах арга, ялгарлыг тооцоолох аргачлан зэрэг know-how-ийг нэмэгдүүлж, олно нь хариуцаж байсан мэргэжилтний туршиш хүргэж ажиллахыг НАОБТГ-аас шаардсан.

5

1.2 Үр дүнгийн хэрэгжилтийн явц

6



Үр дүн-1 Эх үүсвэрийн болон орчны агаарын хяналт шинжилгээг сайжруулах
 Хэрэгжилтийн байдал (2022/5-2022/10)

Үйлчилгээний үр дүн:

- Тогтвортой байдал (НМХТ) нь хяналттай стандарт хяналт (НАОПТ) -г хяналттай хяналттай хяналттай.
- АМТТ-ийн төв лаборатори нийслэл, түүний рингтон шинжилгээний багаар сэр бүр ШТС-аас илгээхүйн нэг эрхтэйг агуулж хяналттай хяналттай.
- НАОПТ, АТУТ-ийн хяналттай 2022 оны 8 сард АСХУХ-ийн хяналттай хяналттай хяналттай.
- Тогтвортой байдал (НМХТ) нь хяналттай хяналттай хяналттай хяналттай.
- 2022 оны 6 сард ДРФ-ийн хяналттай хяналттай хяналттай хяналттай.
- Суурилуулах автобус хяналттай ДРФ-ийн 4-ийн бүрдэл, түүнийг шатаах зүүн хяналттай хяналттай.
- 2022 оны 9 сард НАОПТ-ийн хяналттай хяналттай хяналттай хяналттай.
- 2022 оны 9-10 сард сайжруулах хяналттай хяналттай хяналттай хяналттай.

Үр дүн-1 Эх үүсвэрийн болон орчны агаарын хяналт шинжилгээг сайжруулах
 Хэрэгжилтийн байдал (2022/4-2022/10)

Монгол тахын байгууллагын нийслэл байдал

- Төрийн болон нийслэлийн байгууллагын бүтэц, зохион байгуулалтын өөрчлөлтөөр 2023 оны 1 сард НМХТ-ийг татан буулгаж, холбогдох яам, агентлагын харьяанд хяналттай хяналттай хяналттай хяналттай.
- Цаацдын бүтцийн өөрчлөлт, боловсон хүчнийг шилжүүлэх нарийвчилсан зохион байгуулалтын асуудлыг тодруулж, магадлах шаардлагагүй.
- ДРФ-ийг шилжүүлэн суурилуулах автобусны компани НТГ-аас ДРФ-ийн ашиглалтын зардал, татас олгох боломжгүйн улмаас автобус компаниудад суурилуулсаны дараах ашиглалтын зардлыг бүрдүүлэх асуудал хүндрэлтэй болсон. Одоогоор нэг автобус компани хамтран ажиллахыг зөвшөөрч, суурилуулах ажил хийгдэж байна. Бусад 2 автобус компанийн шийдэр хараахан гаргаагүй байна.

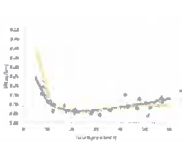


Шатахууны нэмэгдэл агаар бохирдуулах бодисыг бууруулах үр дүнг баталгаажуулах (3)

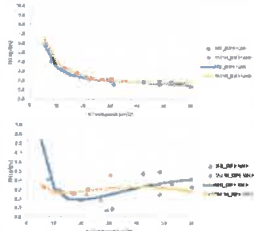
2) Агаар бохирдуулах бодисыг агаарыг бууруулах үр дүнг

Нэмэлтийн (бүтээгдэхүүний) хэрэгсэл, технологийн бодис (сольер матор) -ийг үнэ төлбөргүй бууруулах үр дүнг.

[Суурилуулалт]



[Ачааг агуулалт]



13

DPF-ыг шилжүүлэн суурилуулах

DPF-ыг шилжүүлэн суурилуулах ажлын хүрээнд Сүтэйг буулт ХХК-ын нөхцөл байдлыг нягталсан



Шилжүүлэх автобус

DPF-ын шатаах камер

DPF-ийг бүрдэл

DPF-ын шүүлтүүр

14

DPF шилжүүлэн суурилуулалт (ZongTong үйлдвэрийн автобус)

Трансбус ХХК-д DPF-ыг шилжүүлэн суурилуулах байдал, яармаг төстэй үр дүнг, шүүлтүүр хадгалахтай хол



DPF шилжүүлэн

Мяармаг төст. Баруун DPF-гүй,

Зүүн DPF-гүй

Хялгачилалт байдал

Сүүлийн дугаар автобус



Шүүлтүүр хадгалахтай хол

15

1.2.2 Үр дүн-2 Бүтэн жилийн агаарын бохирдлын бүтцийн шинжилгээ, үнэлгээний чадавхыг сайжруулах

Үр дүн-2.1 РМ-ын эх үүсвэрийн нөлөөллийн дүн шинжилгээ



1.2.2 Үр дүн-2 Бүтэн жилийн агаарын бохирдлын бүтцийн дүн шинжилгээ, үнэлгээний чадавхыг сайжруулах

Хэрэгсэл, технологийн бодис (сольер матор) -ийг үнэ төлбөргүй бууруулах үр дүнг.

Үнэлгээний дүн шинжилгээ:

- 2021 оны 12 сард эхний жилийн турш РМ-ын сорьцаа авч ажлын хэрэгжүүлж байна.
- 2022 оны 4 сард РМ-ын эх үүсвэрийн нөлөөллийн дүн шинжилгээний талар таларуулж, 2022 оны 8 сард нийслэлийн шинжилгээний яамд дүгнэж таларуулжээ. 2022 оны 11 сард яамд хийнгийн байрлалын шинжилгээний технологийн дашааг суурилуулж хэрэгжүүлжээ.
- НАОБТГ нь 2020 оны эх үүсвэрийн хяналтын инвенторын талар таларуулж, таларуулжээ.
- 2022 оны 10-р сард 5-д хийгдэх байгууллагын хүрээнд 2018, 2020 оны талар таларуулж дүн шинжилгээний семинарыг зохион байгуулжээ.
- Гэрээг дохионы горимыг сайжруулахад шаардлагатай суурь өгөгдлийг нундлах зорилгоор 2022 оны 9 сард автозамын хэрэгсэл, технологийн бодис (сольер матор) -ийг үнэ төлбөргүй бууруулах үр дүнг таларуулжээ.

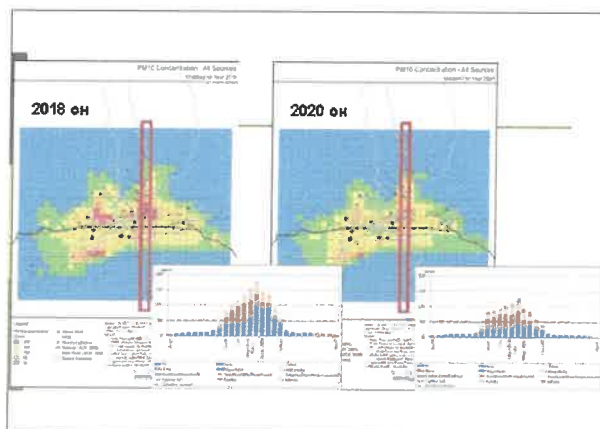
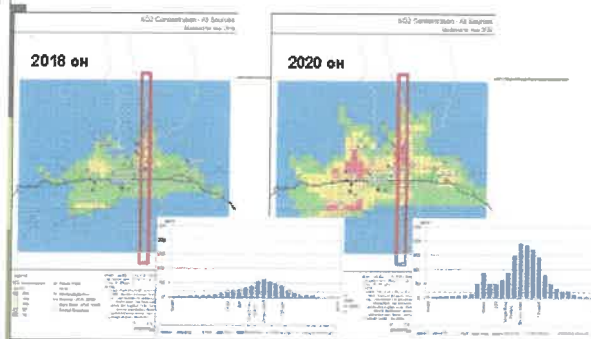
Анхны

НАОБТГ-ын инвентор, талар таларуулж хэрэгсэл, технологийн бодис (сольер матор) -ийг үнэ төлбөргүй бууруулах үр дүнг таларуулж байна. Тус хэрэгсэл, технологийн бодис (сольер матор) -ийг үнэ төлбөргүй бууруулах үр дүнг таларуулж байна. Талар таларуулж хэрэгсэл, технологийн бодис (сольер матор) -ийг үнэ төлбөргүй бууруулах үр дүнг таларуулж байна.

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2018 болон 2020 оны тархалтын загварчлалын дүн

19

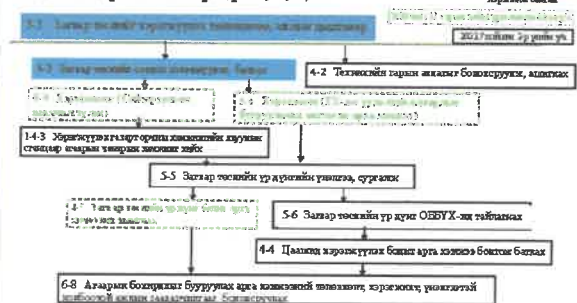


2018 болон 2020 оны тархалтын загварчлалын дүгнэлт

- Сайжруулсан түлшний хэрэглээнд шилжсэнээр ахуйн хэрэглээний зуухнаас үүдэлтэй PM10-ын агууламж бараг тал хувиар буурсан боловч SO2-ын агууламж 3 дахин нэмэгдсэн.
- 2018, 2020 оны агаарын чанарын агууламжийн дүнгээр SO2, PM10 нь агаарын чанарын стандартаас давсан хэвээр байгаа.
- Ахуйн хэрэглээний зуух ихтэй хойд болон баруун өмнө хэсэгт өндөр агууламжтай байна.
- Сайжруулсан түлшний хэрэглээнд шилжсэн нь PM10-ын агууламжийг бууруулахад үр дүнтэй хэдий ч SOx болон SO2-ын агууламжийг бууруулахын тулд түлшинд агуулагдах хүхрийг бууруулах шаардлагатай байна.

22

1.2.3 Загвар төсөл: Үр дүн 3, 4, 5, 6



1.2.3 Загвар төсөл: Үр дүн 3, 4, 5, 6

Хэрэгжилтийн байдал (2021.05 – 2022.10)

Үр дүн 3-ийн ажиглалт:

- 2022 оны 6 сард Эрчим хүчний сайд, Төвөн Тонгой Түний ХХК-ийн технологийн инженерийг оршуулан сайжруулсан шахмал түлшний асуудлаар хэлэлцүүлэг хийсэн.
- 2022.11.27 ~ 12.23, 2023.01.08 ~ 01.20-ны хооронд Тэрэлжийн гэр амарьтын газарт хэрэгжүүлэх загвар төсөлд ашиглах сайжруулсан шахмал түлшний орц найрмалыг баталгаажуулж, Төвөн Тонгой Түний ХХК-д шийтгүүлэх буцаагуурт ашиглан биомассын хольцтой 8 тонн шахмал түлшийг үйлдвэрлэсэн.
- 2022 оны 9 ~ 10 сард загвар төсвийн урьдчилсан туршилыг хийж, асуудлыг тодорхойлсон.
- НАОБТ-ын зууны лаборатори загвар төсөлд ашиглах сайжруулсан шахмал түлшний дээжний хамт угааны шатаалтын туршилыг хийсэн.
- Бэро-5 шатаагуурт хэрэглэх нэмэгдүүлжээт хамбадуурын ЖАЙКА-ын Монгол дахь төлөөлөгчийн гэрээс Монгол улсын Сангийн Яаманд хамдан "Бэро-7" шатаагуурын үнийн зөрүүг өргөхөд өндөрлөхөн өнхлөх ажлаахыг хүссэн албан бичгийг 11 сарын сүүлээр хүргүүлжээр бэлтгэж байна.

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Сайжруулсан шахмал түлшний загвар төслийн хэрэгжилт (2022.05 сараас 2022.10 сар)

2022 оны өвөл хэрэгжүүлэх загвар төслийн (бодит туршилтад) дүнг өмнөх хэмжээний туршилын хяналт утгаар шалгах туршилтад НАОБТ-ын зууны лабораторид хийсэн.

1. Сайжруулсан шахмал түлшний төрөл, зууны лабораторийн дүн

ТТТ компанийн хэмжээний түлш, ТТТ компанийн түлшний 10% биомасс хольж төгрөсөн биомассын хольцтой шахмал (БХШ)

Дугаар	Төрөл	Туршилтын өдөр	Туршилтын зүйл
201	ТТТ	2022/09/21	№3 шүүрэгтүүт төгрөсөн шүүрт хангалтгүй, улаан хийн хэмжээт сайн болов.
206	ТТТ	2022/09/28	Тоос, хийн хэмжээт сайн
202	БХШ	2022/09/22	№1 шүүрэгтүүт төгрөсөн шүүрт хангалтгүй, хийн хэмжээт сайн болов.
205	БХШ	2022/09/27	Тоос, хийн хэмжээт сайн
207	БХШ	2022/10/19	Тоос, хийн хэмжээт сайн

2. Загвар төсөлд ашиглах түлшний дээжийн харьцуулалт (Proximity Analysis)

- Шаталтын туршилтад ашигласан сайжруулсан түлшний техникийн шинжилгээний дүнг хүснэгтээр үзүүлэв. ТТТ компанийн сайжруулсан түлшний үзүүлэлт нь 2020 оны шинжилгээний дүн бөгөөд сүүлийн үеийн шинжилгээний дүн биш болно.
- Ерөнхийдөө хүрнийн зууламжаас бусад үзүүлэлтээр ТТТ болон ВСВ (биомассын хольцтой шахмал) техникийн шинжилгээний дүнд ялгаа байхгүй байна.

	Moisture % (ar)	Total sulfur % (t)	Volatile matter % (t)	Ash % (a)	Calorific value kcal/kg (a)
MNS5678:2022	≤6	≤1,00	≤22	≤27	≥5,200
Tavan Tolgoi Tush	2-5,7	0,84-0,91	21-21,2	22,9-24,0	6,048-6,326
BCB	3,4	0,72	22,7	25	6,016

3. Шаталтын туршилын дүнгийн харьцуулалт (Явцын дүн)

Цөвний шаталтын туршилыг ТТТ-д цахил 2 удаа, БХШ-д 1 удаа хийв.

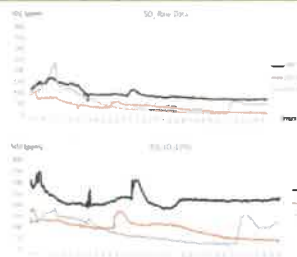
Энд явцын дүнгээс танилцуулав.

Загвар төсөлд уламжлалт зууныг ашигласан учраас явцын туршилын дүнгийн уламжлалт зууныг ашигласан.

Data No.	201	206	202	205	207	Average	
Test Date	2022/09/21	2022/09/28	2022/09/22	2022/09/27	2022/10/19		
Moisture Producer	TTT	TTT	BCB	BCB	BCB	TTT	BCB
Type of stove and coal	Traditional Stove	Traditional Stove	Traditional Stove	Traditional Stove	Traditional Stove	Traditional Stove	Traditional Stove
Coal	Q	Q	Q	Q	Q	Q	Q
Enrichment Factor	Dust mg/m ³	1.9	1.9	1.9	1.9	1.9	1.9
SO ₂ mg/m ³	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NO _x mg/m ³	2.4	2.4	2.4	2.4	2.4	2.4	2.4
CO mg/m ³	101.8	101.8	101.8	101.8	101.8	101.8	101.8
Enrichment Factor	Dust mg/m ³	1.9	1.9	1.9	1.9	1.9	1.9
SO ₂ mg/m ³	1.067	1.067	1.067	1.067	1.067	1.067	1.067
NO _x mg/m ³	0.8	0.8	0.8	0.8	0.8	0.8	0.8
CO mg/m ³	20.888	20.888	20.888	20.888	20.888	20.888	20.888

4. Түлшний SO₂-ын харьцуулалт (явцын дүн)

Хугацааны өөрчлөлт



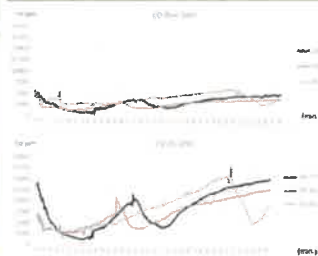
Дээрх график нь SO₂-ийн бодит хэмжээний түлхий өгөгдөл.

Доорх график нь SO₂ (CO 10%-ийг) MNS 5216: 2016 стандартыг зассан "Хэвийн" нөхцөлд шилжүүлэх үзвэл хийн илүүдэл агаарын коэффициент $\alpha = 1.9$ (хүчилтөрөгч 10%-ээр тооцогдсон) утга болно.

Биомассын хольцтой шахмал хэрэглэх үед SO₂ буурсан байна.

5. Түлшний CO-ын харьцуулалт (Явцын дүн)

Хугацааны өөрчлөлт



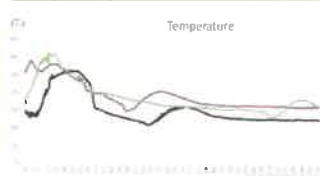
Дээрх график нь CO-ийн бодит хэмжээний түлхий өгөгдөл.

Доорх график нь CO (CO 10%-ийг) MNS 5216: 2016 стандартыг зассан "Хэвийн" нөхцөлд шилжүүлэх үзвэл хийн илүүдэл агаарын коэффициент $\alpha = 1.9$ (хүчилтөрөгч 10%-ээр тооцогдсон) утга болно.

ТТТ, БХШ ашигласан шахмал CO-ыг дээжлэх нөхцөл байдалтай хамарал өөрчлөлтөөр тул нүүр олон далайлах туршилын дүнгээс харах хэрэгтэй.

6. Түлшний шаталтаас үүсэх температурын харьцуулалт (Явцын дүн)

Хугацааны өөрчлөлт



БХШ түлш
① Асалт сайн
② Температурын өсөлт хурдан
③ Шаталтын температур өндөр
④ Шаталтын хугацаа богино

Дээрх дүнгийн загвар төсөлөөр шаталт хамаралтай

Загвар төслийн гол зорилго нь лабораторын шаталтын туршилын дүнг бодит гагцгааны нөхцөл (төр жуулчны бааз)-ийн орчны агаарын чанарын хэмжээний дүнгтэй харьцуулах явдал юм.

Тээврийн хэрэгслийн загвар төслийн хэрэгжилт (2022.05 ~2022.10 сар)

УБ хотын автозамын гэрлэн дохионы удирдлагын систем, зохицуулалтын гормыг сайжруулах зорилгоор төвийн гол уулзварын нэвтрэх урсгалын байдлыг цаг хугацаа, тээврийн хэрэгслийн ангилал, зорчих чиглэлээр хөдөлгөөний эрчмийг тодорхойлох, үхмэл ногоон гэрлийн бөглөрөл, зөвшөөрсөн ногоон гэрлээр нэвтрэх ТХ-ийн тоо, түгжрэлийн урт, ЗХУТ-өөс зохицуулалт хийсэн гэрлэн дохионы асаалтыг барих, солих үеийн бүртгэлийн судалгааг 2022 оны 9 сарын 29 өдөр хэрэгжүүлсэн. Мөн тохиргооны гормыг өөрчлөхөөс өмнөх, дараах үед хөдөлгөөний урсгал хэрхэн өөрчлөгдөж байгааг тодорхойлохын тулд уулзвараар нэвтрэн хөдөлгөөнд оролцож, зорчих хурдны судалгаа хийсэн.

1.4 Япон дахь сургалт

Эхний сургалт

Хугацаа: 2022 оны 11/9-11/23

Сэдэв: РМ-ын химийн найрлагын шинжилгээний технологи

Оролцогч: ЦҮОШГ, БОХЗТЛ-ын 8 мэргэжилтэн (орчим)

2 дахь сургалт

Хугацаа: 2022 оны 12/7-12/21

Сэдэв: Гэрлэн дохионы гормын тохируулга, технологийн дадлага

Оролцогч: Нийслэлийн Замын хөдөлгөөний удирдлагын төв 8 мэргэжилтэн

1.5 Дараагийн хагас жилд хэрэгжүүлэх гол үйл ажиллагааны төлөвлөгөө

1.5.1 Сайжруулсан шахмал түлшний загвар төсөл

Сайжруулсан шахмал түлшний үр дүнг баталгаажуулах зорилгоор 2022 оны 11-р сарын 27-ноос 2023 оны 1-р сарын 20-ны хооронд Тэрэлжийн гэр амралтын газрыг түрээслэн ТТТ компаний сайжруулсан түлш болон тус төслөөс санал болгох биомассын холцтой шахмал түлшнийг гэрийн зууханд шатааж, орчны хэмжээнийг явуулын станцаар агаарын чанарын агууламж, салхны чиглэл, хурдныг хэмээнэ.

November												December												January, 2023																				
1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12									
13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21					
22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					
30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12
31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		
1	2	3	4	5	6	7	8	9	10																																			

2.1 Цаашдын хэрэгжилттэй холбоотой шаардлага (1) DPF-ыг шилжүүлэн суурилуулахад тулгарч буй хүндрэл

- 1) Өмөөрхний нөхцөл байдал
- Япон улсас 2019 оны 8 сард Коматсийн DPF 24 аж бүрдэх, шүүртүүр шилжүүлэх үеэр 15 нь Нийслэлд хүлээлтэй өгсөн. (Нийслэлд зориом хэмжээний автобусныг дахин шилжүүлэх үүрэгтүүр (DPF) суурилуулж, энэ төрлийн шилжүүлэх үүрэгтүүр арга хэмжээг баталгаажуулж, нэгдүгээр ХАЯКА-ын төсөл)
 - Одоо (нэгдүгээр сард 3 жил хугацаа) DPF-ийг автобусны ашиглалтын хугацаа дууссан, шилжүүлэн суурилуулах ажлыг хийдэггүй тул DPF болон хамт байхад тээврийн хэрэгсэл ашиглахгүй байна
 - 2022 оны 6 сард 1 автобусны шилжүүлэн суурилуулах болон ажлын хугацаа дууссан, хадгалуур хэт халах асуудал үүссэн учраас 9 сард DPF-ыг салгаж авсан.
 - НТГ-ны хувийн хэвцлийн автобус компанид DPF суурилуулахад 3 компанид тохиролцсон боловч эцсийн байдлаар зөвлөхөөрөн нэг хамтын нэгдлийн хамт байхад 2022 оны 9 сард ажлын үүрэгтүүр дууссан бусад тоног төхөөрөмжийн ашиглалтын хугацаа дууссан байна
- (2) Асуудал ба шийдэл
- DPF ашиглалтын эхлэлд автобус компани бие дааш хариуцаж байгаа, дэмжлэг төлөх байхгүй.
 - DPF ашиглалтын эхлэлд савуурагч байхгүй улмаас шилжүүлэн суурилуулах ажлын хугацаа дууссан автобус компани төсөв байна.
 - DPF ашиглалтын эхлэлд татвар салгах байдлаар автобус компани зардалын ачааллыг хангаж

2.1 Цаашдын хэрэгжилттэй холбоотой шаардлага (1) DPF шилжүүлэх суурилуулах

Асуудал	Шийдэл
2022 оны 6 сард шилжүүлж суурилуулсан боловч ашиглаагүй автобусны хөдөлгөөнийн горим доголдон (HYUNDAI-д тохиролцож байх магадлалтай) тул DPF-ыг салгаж авсан	Япон талас НТГ-г хандаж дараах шаардлагыг тавьж байна. (1) DPF-ын тоног төхөөрөмжийн бүртгэл, хадгалалт (шилжүүлэн суурилуулах хүргэл)
НТГ нь DPF тоног төхөөрөмжийн хөдөлгөөнийг тодорхойлж, суурилуулах автобус компанид зохихуурагч хийсэн. Тоног төхөөрөмжийн хадгалалт хугацаа зарим эд ангийг ашиглах боломжгүй болсон, мөн тодорхой тодорхойлж зохихуурагч гарсан	(2) DPF суурилуулсан автобусны компанид ашиглалтын зардалыг гаргаж өгч, өдөр тутмын ашиглалтад дэмжлэг үзүүлж
Автобус компанид хийсэн нь DPF-ын ашиглалтын зардалыг өөрсдөө хариуцах боломжгүй учраас суурилуулах ажлыг (1 компаниас бусад) хүлээж авалгүй	(3) DPF суурилуулсан автобусны компанид хөдөлгөөнийг, дараах тал (татварас чөлөөлж эргэ) бий болгож
Япон ашиглалтын эхлэлд татвар салгахуурагч тохиролцсон боловч эцсийн байдлаар зөвлөхөөрөн нэг хамтын нэгдлийн хамт байхад 2022 оны 9 сард ажлын үүрэгтүүр дууссан бусад тоног төхөөрөмжийн ашиглалтын хугацаа дууссан учраас DPF-ыг шилжүүлэн суурилуулах үйл ажиллагааг хэрэгжүүлж болох магадлалтай байна	(4) DPF суурилуулсан автобусны ашиглалтын хугацаа дууссан тохиролцсон дараагийн автобусанд шилжүүлж суурилуулах зардалыг бүрдүүлж, шилжүүлэн суурилуулахад дэмжлэг үзүүлж

2.1 Цаашдын хэрэгжилттэй холбоотой шаардлага (1) Хүхэр багатай шатаахууны нэвтрүүлэхтэй холбоотой асуудал

Асуудал	Шийдэл
2022 оны 4 сард Агаарын тухай хууль, агаар чадарын сайжруулсан бүсэд экологийн ангилалын хүхэр багатай шатаахуунаас доогуур ангилалын шатаахууныг шилжүүлж, хэрэглэхийг хориглосон. Гэсэн хэдий ч хүхэр багатай шатаахууныг (Евро-2) нийтийн тээврийн автобусанд хэрэглэхээр байна. Мөн, нийтийн тээврийн автобус баа Евро-5 стандартын автобусыг худалдан авчирсан ч Евро-5 шатаахууны хангалт байхгүй улмаас энгийн дизель түлш хийж явснаар хөдөлгөөнд доголдож үүсч ашиглах боломжгүй болсон байна. Өөр бусад евро-5 хөдөлгөөнт автобусанд ашиглан асуудал үүсэж магадлал өндөр байна	Япон талас шатаахууны түлшний асуудал хариуцсан байгууллагад дараах шаардлагыг хүргүүлж байна. (1) УБ хотод энгийн түлш борлуулалтын хориглох. (2) Энгийн түлшгүй харуулахад хүхэр багатай түлшний үнийн зөрүүг арилгах (Омцгой татвар гэж мэт) (3) Евро-5 ба түүнээс дээш утаа ялгаруулах журамд нийцсэн тээврийн хэрэгсэлд энгийн түлш хэрэглэхээс баях доголдон гарч боломжгүй талаар сурталчилгаа үйл ажиллагааг хэрэгжүүлж (4) Евро-5 буюу түүнээс дээш утаа ялгаруулах журамд нийцсэн тээврийн хэрэгсэлд DPF гэж мэт зохих засвар үйлчилгээний мэдээллийг нийтэд түгээх үйл ажиллагаа

2.1 Цаашдын хэрэгжилттэй холбоотой шаардлага (2) Инвентар, тархалтын загварчлал

Асуудал	Шийдэл
2021 оны 12 сарын ХЗХ-ны 6-р хуралдаанаас гарсан санал	Холбогдох байгууллагын хүрээнд хариуцан ажлынх боломжгүй
2022 оны 9 сард ялгарлын инвентар, тархалтын загварчлал боловсруулах, загварчлалын боловсруулах, үр дүнг бохирдлыг бууруулах арга хэмжээг үнэлэх нэгтгэл (y/a 2-2-7-оос 2-2-9) ажлынх ажлын Монгол талын байгууллага (НАОБТ, дээд сургууль, хувийн хэвцлээр ЦУОШП, ЦУОШМХ) -ын үүрэг, оролцоог гүйцэтгүүлэх боломжийг судалж, тодорхойлсон хамтран ажлынх гэрээний хэрэгсэл нийтийн бүрдүүлэх төслийг хийгээсэн.	Хариуцсан мэргэжилтэн ажлаас гарч, боловсон хүчин дутагдахтай байгаагаас хариуцах байгууллага тогтоогүй байна.

Холбогдох байгууллагын үүрэг, оролцооны хувиарлалт (гэрээний төсөл)

Байгууллага	Байгууллагын үүрэг
НАОБТ	1. Агаар бохирдуулж буй агаарын бохирдлын тооцоог өөрчлөх, өөрчлөх, бүртгэхийн мэдээлэл, судалгаа өгөхдөгч, судалгаа, гэрээний төсөл 2. Ялгаралтын тооцоог боловсруулж, өөрчлөх, өөрчлөх, бүртгэхийн мэдээлэл 3. НАОБТ-ын хариуцаж буй агаарын бохирдлын тооцоог өөрчлөх, өөрчлөх, бүртгэхийн мэдээлэл 4. Улаанбаатар хотын агаарын бохирдлын тооцоог өөрчлөх, өөрчлөх, бүртгэхийн мэдээлэл 5. Агаарын бохирдлыг бууруулах арга хэмжээний санал боловсруулж 6. Агаарын бохирдлыг бууруулах арга хэмжээний санал боловсруулж
ЦУОШП	1. ЦУОШП-ын хариуцаж буй агаарын бохирдлын тооцоог өөрчлөх, өөрчлөх, бүртгэхийн мэдээлэл 2. Агаарын бохирдлын тооцоог өөрчлөх, өөрчлөх, бүртгэхийн мэдээлэл 3. Улаанбаатар хотын агаарын бохирдлын тооцоог өөрчлөх, өөрчлөх, бүртгэхийн мэдээлэл 4. Агаарын бохирдлыг бууруулах арга хэмжээний санал боловсруулж
ЦУОШМХ	1. УБ хотын агаарын бохирдлын тооцоог өөрчлөх, өөрчлөх, бүртгэхийн мэдээлэл 2. УБ хотын агаарын бохирдлын тооцоог өөрчлөх, өөрчлөх, бүртгэхийн мэдээлэл 3. Улаанбаатар хотын агаарын бохирдлын тооцоог өөрчлөх, өөрчлөх, бүртгэхийн мэдээлэл 4. Агаарын бохирдлыг бууруулах арга хэмжээний санал боловсруулж
Бүтэц байгууллага	1. Агаарын бохирдлын тооцоог өөрчлөх, өөрчлөх, бүртгэхийн мэдээлэл 2. Агаарын бохирдлын тооцоог өөрчлөх, өөрчлөх, бүртгэхийн мэдээлэл 3. Агаарын бохирдлын тооцоог өөрчлөх, өөрчлөх, бүртгэхийн мэдээлэл 4. Агаарын бохирдлыг бууруулах арга хэмжээний санал боловсруулж

3. Хэлэлцэж, шийдвэрлэх зүйлс

3.1 ТТМ-д ХЗХ-ны дарга болон төслийн даргыг өөрчлөх

■ ХЗХ-ны дарга

- Нийслэлийн шинэчилсэн бүтэц, зохион байгуулалтаар төслүүдийн удирдлагын албан тушаал хаагдсан тул төслийн даргын бичиг болох ТТМ-д ХЗХ-ны даргыг Агаар, орчны бохирдлын асуудал хариуцсан төслүүдийн удирдлаг гэж засныг Нийслэлийн Засаг даргын Нийгмийн салбар, ногоон хөгжлийн болон агаар, орчны бохирдлын асуудал хариуцсан орлогч болгон өөрчлөх.

■ Төслийн дарга

- 2021 оны 1 сарын ХЗХ-ны 4-р хуралдаанаар төслийн даргаар НАОБТ-ын бодлогын хэрэгжүүлэх хэлтсийн дарга байсныг 2018 оны 10 сард байгуулсан төслийн санамж бичигт заасны дагуу НАОБТ-ын дарга болгон өөрчлөх.

Project Design Matrix (PDM)

Ver.1.7
Dated: December 9, 2022

Project Title: Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3

Implementing Agency: Department of Against Air and Environmental Pollution (DAAEP) of Ulaanbaatar (UB) City, Ministry of Environment and Tourism (MET) and Counterpart Working Group (C/P-WG)

Target Group: DAAEP, MET, C/P-WG and Relevant Agencies

Duration of the Project: November 2018 – July 2024 (5 years and 9 months)

Project Site : UB City

Narrative Summary		Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Emission reduction at major emission sources is enhanced towards air quality improvement in Ulaanbaatar City.		1. XX% of emissions from major pollution sources is reduced compared with the BAU baseline.	1. Comparison between BAU and updated inventory for target year (3 to 5 years after completion of the Project)	
Project Purpose Capacity for air pollution control in Ulaanbaatar City is strengthened, paying special attentions to implementation of effective pollution control measures and to the necessary coordinating mechanism of DAAEP and the relevant agencies.		1. One of pilot projects are adopted as full scale implementation by relevant authorities. 2. At least one case of lessons learned from the pilot projects are utilized by the decision makers. 3. Relevant laws, regulations and standards on air pollution control measures are implemented in UB City. (At least establishment of one MNS, and/or 70% of compliance in the dust emission standards of existing MNS; MNS5043:2016 (General technical requirement of heat water boiler under 4.2MW) and MNS5919:2008 (Emission limit value and measurement method of power plant, steam boiler))	1. The Project reports 2. Interview survey to the relevant agencies 3. Laws, regulations, MNS standards, and ordinances of UB City	
Outputs Output 1: Capabilities of emission monitoring for the major pollution sources and of air quality monitoring are strengthened. Output 2: Capabilities to analyze and evaluate pollution structure of PM, SO ₂ , and NO _x throughout the year are strengthened. Output 3: Capabilities of technical evaluation and preparation of air pollution control measures for implementation are strengthened.		1-1. During the Project duration, at least 50 % of inspections for boiler registration based on emission measurements (including standard and simplified methodologies) are implemented by DAAEP and IACC. 1-2. The emission measurement reports are submitted to Project Leader of UB city in charge of air and environmental pollution at least 3 times during the Project duration. 1-3. Emission monitoring for the major pollution sources and air quality monitoring information are shared regularly among the relevant agencies through coordination between DAAEP and NAMEM. 1-4. The CEMS measurement is compared with the standard measurement once in a year. 1-5. Distribution of emission measurements from vehicles in UB City is prepared based on the study with RSD at least once a year. 2-1. The results of PM apportionment study are reported at least three times during the Project. 2-2. Pollution structures are assessed at least 3 times during the Project duration including emission inventory, simulation model, PM speciation, receptor model, air quality monitoring and population exposure throughout the year. 3-1. Drafts of emission measurement methods and quality standards of improved fuel for households in Ger area are submitted to MASM. 3-2. At least three of implementation plans of the pilot projects are prepared.	1. Emission measurement reports by DAAEP / IACC 2. The Project reports 3. Boiler registration database 4. Air quality monitoring monthly reports and annual reports 5. CEMS data 1. The Project reports	1. Legal and political framework for air quality management is maintained, which defines decision making mechanism such as NCEPR and professional agencies like DAAEP and NAMEM. 2. The COVID-19 pandemic situation will be improved and JICA will be able to send JICA Experts to Mongolia toward April 2021 until the end of the Project.

Output 4: Decision making process for air pollution control is improved by utilizing the Professional agencies including DAAEP, NAMEM and the relevant agencies.	4-1. Analysis of air pollution status, short-, medium- and long- term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned) are presented to decision makers at least 2 times. 4-2. Results of pilot project implementation and other Project results are utilized for the revision of NCEPR and for decision making on implementation/non-implementation of pollution control measures at least once.	1. The Project reports 2. Reports on NPREP
Output 5: Air pollution control measures are enhanced for PM, SO ₂ and NO _x emission reduction at major sources.	5-1. At least three pilot projects selected by C/P-WG are implemented 5-2. The results of each pilot project (emission reduction, improvement of ambient air quality and population exposure for PM, SO ₂ and NO _x) are presented to the relevant agencies.	1. The Project reports
Output 6: Legal framework, resource allocation and coordinating mechanism as a Platform for the Air Quality Management Cycle are strengthened for the Outputs 1 to 5.	6-1. At least three of drafts on laws and regulations, such as fuel regulations, MNS emission standards and ordinances of UB City, are submitted. 6-2. More than 3 air pollution control measures and technologies are funded by the sections of the relevant agencies in charge of allocating funds for air pollution control by utilizing technical appraisal guideline provided by the Project. 6-3. At least three agreements are made on demarcation of roles of the relevant agencies for air pollution control measures in the Project. 6-4. The operational guideline is distributed to relevant agencies.	1. Laws and regulations, fuel regulations, MNS emission standards and ordinances of UB City 2. Minutes of Meeting of NCEPR 3. Official documents including UB city Governor's orders 4. Operational guideline

Activities		Inputs	
1-1 1-1 DAAEP and IACC reinforce HOB inspections based on on-site stack gas measurements. 1-1-1 DAAEP and JICA Experts assess the technical transfer on-site stack gas measurement. 1-1-2 DAAEP with JICA Experts re-constructs 2 teams of stack gas measurement. 1-1-3 IACC and the relevant agencies with JICA Experts implement HOB inspection based on on-site stack gas measurement. 1-1-4 IACC with JICA Experts introduces simplified measurement method by using IACC's portable gas measurement equipment including parallel measurement with JIS method, elaboration of manuals and manufacturer's calibration. 1-1-5 DAAEP and IACC with JICA Experts elaborate emission measurement reports. 1-2 TPP3 and TPP4 with JICA Experts enhance emission gas control by utilizing CEMS. 1-2-1 TPP3 and TPP4 with JICA Experts elaborate and implement CEMS operation and maintenance plan. 1-2-2 TPP3 and TPP4 with JICA Experts perform quality control of emission gas data of CEMS. 1-2-3 TPP3 with MET and the relevant agencies elaborates online emission data reporting system for the CEMS. 1-2-4 NAMEM and the relevant agencies share and evaluate CEMS emission data. 1-2-5 NAMEM compiles monitoring data of emissions from TPP2, TPP3, TPP4 and new large heat supply facilities and share them with relevant agencies. 1-3 MRTD and PTD introduce relevant regulations of vehicles based on emission measurement. 1-3-1 MRTD and PTD with JICA Experts implement vehicle emission measurements by RSD, assess distribution of vehicles emission intensity and define target vehicles to be regulated. 1-3-2 MRPA and IACC with JICA Experts implement automobile fuel surveys. 1-3-3 JICA Experts conduct training to NRTC, in addition to DAAEP, on vehicle emission measurement using on-board emission measurement system, and DAAEP and NRTC implement vehicle emission measurement using on-board emission measurement system.	Japanese side 1. JICA experts (necessary fields) (1) Chief Advisor (2) Air Pollution Control Planning and Policy (3) Emission Measurement for Stationary Sources (4) Ambient Air Quality Monitoring (5) Ambient Air Quality Analysis (6) PM10 and PM2.5 Sampling (7) PM10 and PM2.5 Apportionment Study (8) Emission Inventory (Stationary, Mobile and Others) (9) Air Quality Simulation Modeling / Air Pollution Control Measures Evaluation	Mongolian side 1. C/P and C/P-WG (1) JCC Chairperson (2) JCC Vice-Chairperson (3) Project Director (4) Project Manager (5) Necessary C/P and C/P-WG staff according to the fields of JICA Experts 2. Facility (1) Provision of necessary office space in DAAEP and MET (including internet access) (2) CLEM Laboratory (3) Storage Space for Equipment 3. Local cost (1) Counterpart expenses such as salary, allowance,	1. There are no frequent leaves, transfers or resignations of C/P and C/P-WG members. 2. Necessary coordination among UB city, districts, khoroos and communities in Ger area is secured by Mongolian side for implementation of pilot projects.

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1-3-4 PTD with JICA Expert transfer the DPFF which were installed on 24 large buses by the project "Verification Survey with the Private Sector for Disseminating Japanese Technologies for Emission Reduction of Particulate Matter (PM) from Diesel Buses by DPFF" to other buses. 1-4 DAAEP and NAMEM with JICA Experts strengthen AQMS utilization. 1-4-1 CLEM and JICA Experts assess the current status of equipment in reference laboratory of CLEM and identify necessary actions if necessary. 1-4-2 DAAEP reinforces AQMS operation and maintenance based on the plan by Phase 2. 1-4-3 DAAEP with JICA Experts starts air quality monitoring at pilot project area for improved household fuels by utilizing mobile AQMS. 1-4-4 DAAEP with JICA Experts reinforces the AQMS at Bayankhoshuu station. 1-4-5 DAAEP and NAMEM with JICA Experts implement parallel measurement by FRM sampler for PM concentration, and implement quality control of PM measurements of AQMS. 1-4-6 DAAEP and NAMEM with JICA Experts maintain the online information system of AQMS. 1-4-7 DAAEP and NAMEM share real-time monitoring data with the relevant agencies through the online information system. 1-4-8 DAAEP and CLEM with JICA Experts analyze air quality monitoring data and elaborate air quality monitoring reports. 1-4-9 The relevant agencies utilize air quality monitoring data. 1-4-10 DAAEP with JICA Experts establishes the data transfer system of air quality monitoring data of Dambadarjaa station to the online information system of AQMS. 2-1 NAMEM and JICA Experts conduct PM apportionment study based on PM speciation throughout the year. 2-1-1 CLEM and JICA Experts elaborate PM sampling plan throughout the year, and implement PM samplings. 2-1-2 JICA Experts perform PM speciation analysis in Japan. 2-1-3 NAMEM and CLEM with JICA Experts learn PM speciation technologies (ion analysis, element analysis and carbon analysis). 2-1-4 NAMEM and CLEM with JICA Experts formulate equipment and laboratory plan for PM speciation. 2-1-5 DAAEP and NAMEM with JICA Experts perform PM apportionment study based on receptor modeling. 2-2 DAAEP and NAMEM with JICA Experts evaluate air pollution structure and health impact based on air quality simulation model and receptor model. 2-2-1 DAAEP and NAMEM elaborate plans for updating emission inventory. 2-2-2 DAAEP, TCC and PTD implement studies for mobile sources including update of emission inventory, examination of traffic signal control, traffic volume and vehicle traveling speed. 2-2-3 DAAEP and JICA Experts select the pilot areas and assess Ger stoves usage pattern (type and model of stoves, seasonal pattern of usage, insulation of Ger housing and coal consumption). 2-2-4 DAAEP and NAMEM with JICA Experts implement studies for other emission sources as necessary. 2-2-5 DAAEP and NAMEM with JICA Experts elaborates BAU (Business as usual) scenario for the future year based on TPPs future development plans, projection of number of vehicle, population, economic growth, emission regulation, fuel quality regulation and so on. 2-2-6 DAAEP and NAMEM update emission inventory for the present year and the future year for the BAU scenario. 2-2-7 DAAEP and NAMEM update the air quality simulation model for PM10, SO₂ and NO_x. 2-2-8 DAAEP and NAMEM evaluate the air pollution structure of UB city. 2-2-9 DAAEP and NAMEM evaluate indicative population exposure of PM10 based on population weighted concentration and so on. 3-1 DAAEP and the relevant agencies elaborate a draft MNS on an emission measurement method of improved fuel and fuel quality, and propose it to MASIM. 3-2 ME with JICA Experts elaborates safety standards on the household gas distribution. 3-3 DAAEP and the relevant agencies elaborate implementation plans and terms of reference for pilot projects such as improved fuel, HOB, traffic signal control, eco-driving, RSD, smoke belching program based on portable emission device, DPFF, low sulfur fuel and low emission vehicles.	(10) Auto-mobile Emission Control 1 (Traffic Signal Control) (11) Auto-mobile Emission Control 2 (RSD and others) / Emission Measurement 2 (12) Clean Coal Technology for Air Pollution Control Measures (13) CEMS Data Analysis (14) Stationary Source Emission Control Measures (15) Air Quality Administration (16) Public Awareness and Public Relations 2. Training (1) Local seminars and workshops (2) Training course in Japan 3. Provision of necessary equipment 4. Local cost Necessary expenses for activity of JICA Experts travel cost and accommodation (2) Project administrative expenses
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4-1 DAAEP and NAMEM submit to the decision makers the analysis of air pollution status, short-, medium- and long-term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned). 4-2 Relevant agencies with pilot projects elaborate technical guidelines and utilizes them. 4-3 The relevant agencies discuss and endorse the selection of pilot projects. 4-4 NCEPR and the relevant agencies approve large scale investments based on pilot projects implementation and assessment. 4-5 NCEPR, or the sections of the relevant agencies in charge of allocating funds for air pollution control in the Mongolian government such as the Environment and Climate Fund utilizes the Outputs of the Projects and pilot projects implementation and assessment.	5-1 DAAEP with Health Department of Capital City and the relevant agencies implements public awareness and advisory activities for citizens including school students and parents. 5-2 MET and DAAEP publish progress of the Project by newsletter, newspaper articles, web-site and other medias. 5-3 DAAEP and JICA Experts provide technical guidance to manufacturers for improved fuel production. 5-4 The relevant agencies with JICA Experts implement pilot projects according to the implementation plan by Activity 3-3. 5-5 The relevant agencies with JICA Experts evaluate pilot projects results in terms of emission reduction, air quality improvement and exposure to citizens, and extract lessons learned. 5-6 The relevant agencies with JICA Experts report the pilot projects results to NCEPR. 5-7 TPP3 and TPP4 analyze CEMS data, and examine viable air pollution control measures. 5-8 TPP3 and TPP4 with JICA Experts elaborate emission reduction plans. 6-1 The relevant agencies discuss and elaborate written agreements on demarcation of roles in air quality management related with each Output and Activity of the Project. 6-2 DAAEP with JICA Experts submits technical documents to NCEPR for improved fuel standard, emission standard on stationary sources, mobile sources and other emission sources, and revision of ordinance. 6-3 NCEPR and the relevant agencies elaborate fuel standard and emission standard, and submit them to MASM. 6-4 Relevant ministries / relevant agencies of UB city elaborate laws, regulations and ordinances on air pollution control measures, and submit them to national parliament / city council. 6-5 JICA Experts provide training on air pollution control measures and technical appraisal guidelines for staff of the sections of the relevant agencies in charge of allocating funds for air pollution control. 6-6 Staff of the sections of the relevant agencies in charge of allocating funds for air pollution control with JICA Experts improve relevant operations with allocating funds for air pollution control measures, if necessary. 6-7 Mongolian side enhances donor coordination in air pollution control. 6-8 Relevant agencies of pilot projects with JICA Experts develop an operational guideline for elaboration, implementation and evaluation of air pollution control measures based on pilot projects implementation.	Pre-conditions 1. Appropriate number of qualified staff of C/P and C/P-WG is assigned. 2. Adequate amount of budget related with the Project implementation is secured. 3. Necessary human resources mobilization related with pilot projects is secured by Mongolian side.
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AQMS: Air Quality Monitoring Station
BAU: Business as Usual
CEMS: Continuous Emission Monitoring System
CFWH: Coal Fired Water Heater
C/P: Counterpart
C/P-WG: Counterpart Working Group
DAAEP: Department of Against Air and Environmental Pollution of Capital City
DPF: Diesel Particulate Filter
FRM: Federal Reference Method
HOB: Heat Only Boiler
IACC: Inspection Agency of the Capital City
MASM: Mongolian Agency for Standardization and Metrology
MET: Ministry of Environment and Tourism
MMHI: Ministry of Mining and Heavy Industry
MNS: Mongolian National Standard

MRPA: Mineral Resources and Petroleum Authority
MRTD: Ministry of Road and Transport Development
NAMEM: National Agency for Meteorology and Environment Monitoring
NCEPR: National Committee for Environment Pollution Reduction
NPREP: National Program on Reducing Environment Pollution
NRTC: National Road Transport Center
PTD: Public Transportation Department of the Capital City
PM: Particulate Matter
RSD: Remote Sensing Device
TCC: Traffic Control Center of the Capital City
TPP: Thermal Power Plant

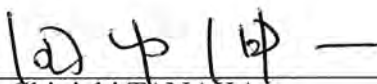
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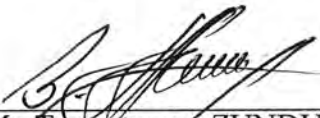
MINUTES OF MEETING OF
THE NINTH JOINT COORDINATING COMMITTEE MEETING
ON JAPANESE TECHNICAL COOPERATION FOR
CAPACITY DEVELOPMENT PROJECT FOR AIR POLLUTION CONTROL IN
ULAAANBAATAR CITY PHASE 3 in MONGOLIA

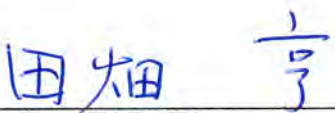
The Japan International Cooperation Agency (hereinafter referred to as “JICA”) Supervisory Team for “Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3 in Mongolia (hereinafter referred to as “the Project”), JICA Mongolia Office, and JICA Expert Team (hereinafter referred to as “JET”) had a series of meetings with Department of Against Air and Environmental Pollution of Capital City (hereinafter referred to as “DAAEP”), Ministry of Environment and Tourism (hereinafter referred to as “MET”) and Joint Coordinating Committee (hereinafter referred to as “JCC”) members from 18th May to 22nd June 2023 to discuss the Progress Report 5 and the Monitoring Sheet 9, and the ninth JCC meeting of the Project chaired by Mr. Tumurtumuu ZUNDUI, Deputy Governor of Capital City in Charge of Social Sector, Green Development and Air and Environmental Pollution on 12th June 2023. Participants list of the seventh JCC meeting is shown in Annex I.

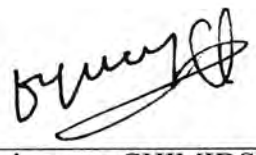
Japanese side and Mongolian authorities had a series of discussions. As a result of discussions, both sides agreed on matters referred to the document attached hereto.

Ulaanbaatar, 22nd June 2023


Mr. Shinichi TANAKA
Leader, JICA Supervisory Team,
Chief Representative
JICA Mongolia Office
Japan International Cooperation Agency,
Japan,


Mr. Tumurtumuu ZUNDUI
Deputy Governor of Capital City
in Charge of Social Sector, Green
Development and Air and
Environmental Pollution


Mr. Toru TABATA
Leader, JICA Expert Team, Japan


Mr. Choigunsen CHIMIDSUREN
Director General
Development Financing Investment
Department
Ministry of Finance, Mongolia

ATTACHED DOCUMENT

I. Progress Report 5 and the Project Monitoring Sheet 9.

JET explained the progress of the Project, future activity plan, and issues that the Project is facing since its beginning. After active discussions, the JCC approved the Progress Report 5 and the Project Monitoring Sheet 9.

II. Revision of the Activities of Project Design Matrix

1. Activity 1-1

“1-1 DAAEP and Inspection Agency of the Capital City (hereinafter referred to as “IACC”) reinforce HOB inspections based on on-site stack gas measurements.”
will be replaced by;

“1-1 DAAEP and IACC^{※1} reinforce HOB inspections based on on-site stack gas measurements.”

※1 According to Mayoral Order A/1649 "Partial Measures Related to the Abolition of Inspection Agency of the Capital City" dated December 30, 2022, Audit Division was added to DAAEP.

2. Activity 1-1-4

“1-1-4 IACC with JICA Experts introduces simplified measurement method by using IACC’s portable gas measurement equipment including parallel measurement with JIS method, elaboration of manuals and manufacturer’s calibration.”
will be replaced by;

“1-1-4 IACC with JICA Experts introduces simplified measurement method by using IACC’s portable gas measurement equipment including parallel measurement with JIS method, elaboration of manuals and manufacturer’s calibration.”^{※2}

※2 Since the Audit Division and the Air Quality Measurement and Operation Division of DAAEP do not perform simplified measurement, Activity 1-1-4 was terminated through December 30, 2022.

3. Activity 3-2

“3-2 Ministry of Energy with JICA Experts elaborates safety standards on the household gas distribution.”
will be replaced by;

“3-2 JICA Experts collect information about fuel gas usage in Mongolia, elaborate safety standards for gas based on Japanese experiences, and then submit it to Ministry of Energy.”

III. Revision of the Output Indicator of Project Design Matrix

1. Objectively Verifiable Indicator 6-2

Ms. Oyunchimeg BATJARGAL of Secretariat of National Committee for Environment Pollution Reduction (hereinafter referred to as “NCEPR”) mentioned that regarding revision of objectively verifiable indicator 6-2, we agree with the use of a guideline. On the other hand, mandates and regulations of the Secretariat of NCEPR were determined by the Mongolia Government. We need to discuss this indicator separately with Japanese Experts.

Mr. Tumurtumuu ZUNDUI of the JCC Chairperson mentioned that the members of the NCEPR are ministers of ministries and agencies, etc. It is beyond the authority of Ulaanbaatar Municipality to determine the indicators on its own and present them to NCEPR. The Japanese Experts need to discuss and change the indicator 6-2 with the Secretariat of NCEPR.

Mr. Toru TABATA of Leader of JET responded that the Japanese Experts will discuss and decide on this matter separately with the Secretariat of NCEPR.

IV. Comment from Mongolian side of the issues on the future project activities

1. Comment on continued technology transfer for implementation of simulations.

Mr. Buyannemekh of Director General of Environmental Policy Coordination Department of MET requested that although technology transfer for simulation has been conducted since Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 1, Mongolian side has not been able to continuously secure human resources and has not been able to execute air quality simulation model. We request Japanese Experts to implement technology transfer including to the National University of Mongolia (hereinafter referred to as “NUM”) in order to enable air quality simulation model to be executed on Mongolian side after the end of the Project.

Mr. Batbayar JADAMBA of NAMEM responded that a lack of human resources to independently develop emission inventories and the lack of institutions and human resources to independently execute air quality simulation model are issues on Mongolian side. As a solution, Mongolian side hope to enable NUM to execute air quality simulation model in collaboration with NAMEN. Therefore, DAAEP, NAMEM, and NUM signed a letter of agreement. Since Mongolian side will execute the simulation model in the future, we request that Japanese Experts execute the simulation model and transfer the technology related to the simulation model to Mongolian side during the duration of the Project.

Mr. Tumurtumuu ZUNDUI of the JCC Chairperson mentioned that the inability to secure and sustain human resources in technology transfer destinations is an issues on Mongolia. Institutionally and politically, human resources are not functioning stably.

Mr. Natsuji SAWAKI of Deputy Leader of JET responded that Mongolian side requested retraining at the 3rd JCC in December 2019, and JET has been implementing the technology transfer on the condition of securing at least two persons in charge from each

institution, however, the persons in charge have not been fixed. On the other hand, there is only one year left in the Project duration. In order to achieve the Project activities to execute the simulation model and evaluate the countermeasures by the end of the Project. Japanese Experts have to execute the simulation model and explain the method of evaluating the countermeasures to Mongolian side. In addition, Japanese Experts are considering technology transfer to Mongolian side for the development of inventories and execution of simulations to the extent feasible.

2. Advice of Air Law

Mr. Buyannemekh of MET mentioned that responsibilities of the Ulaanbaatar Municipal Government and the provincial governments with respect to air pollution reduction are defined in an Air Law, however, responsibilities of the various ministries and agencies are not defined. Therefore, MET is considering revisions of the Air Law and plans to establish a working group in the future. We request Japanese Experts to participate in the working group and advise us accordingly.

Mr. Tumurtumuu ZUNDUI of the JCC Chairperson mentioned that currently, only the Ulaanbaatar Municipal Government is responsible for air pollution reduction, however, it is very important to amend the Air Law to add the responsibilities of each ministry and agency. It is important that Japanese experts will provide Mongolian side advice on the revision of the Air Law based on their extensive knowledge and experience and Japanese case studies.

Mr. Natsuji SAWAKI of Deputy Leader of JET responded that Japanese Experts are available to provide technical advice within the scope of PDM activities. We will discuss again with MET when the working group is established.

V. Comments regarding issue of popularizing low-sulfur fuels

Ms. Mongolmaa of Ministry of Mining and Heavy Industry (hereinafter referred to as “MMHI”), Fuel Policy Department responded that MMHI considers that it important to have the same price for Eueo2 and Euro5 fuel, and MMHI has proposed to Ministry of Finance that a tax credit and selling price be the same. However, Ministry of Finance has not given any positive consideration to this matter. The usage of Euro 5 fuel for Euro V public buses is considered to be a priority, however, a challenge is the regulation on tendering in Ulaanbaatar Municipality requires that the lowest priced fuel be procured.

Mr. Tumurtumuu ZUNDUI of the JCC Chairperson mentioned that Ulaanbaatar Municipal Government provides a huge budget including grant money to Transportation Public Department of Capital City. Also Ulaanbaatar Municipal Government is trying to improve a public transportation system and service management. So far, Ulaanbaatar Municipal Government purchased 270 Euro V Buses including EV buses, and plans to purchase 800 buses more this year and next year. I would like to address this issue of Euro5 fuel at the Mayor's Council and Council meetings to explain decision makers to

make effort to solve this issue.

Mr. Atsushi SATO of JET mentioned that previously, due to the usage of Euro 2 fuel for Euro IV buses, the buses broke down and were all scrapped. If the Euro 2 fuel is continued to be used in Euro V buses, it is very likely that all Euro V buses will be out of service in the near future. Although the tenders of Ulaanbaatar Municipal Government indicate that the cheapest fuel in terms of price must be procured, the Euro V bus operation manual clearly specifies that Euro 5 fuel must be used. This issue is able to be solved by changing the tender specifications to procure the lowest priced Euro V fuel when tendering for the fuel of public transportation buses. Japanese Experts request Mongolian side to take immediate action, as 112 buses of National public bus company introduced this year are likely to break down within next few months and ultimately be scrapped.

VI. Conclusions by Mr. Tumurtumuu ZUNDUI, the JCC Chair Person

The Project implementation duration is only one year left, and it is important for Mongolian side to take positive actions and responses from the concerned parties. The achievement of the results of this project is mainly the responsibility of Mongolian side and the outcome of many years of efforts by the Japanese Experts. I hope that Mongolian side will feel responsible for the Project and take a proactive approach. I expect that at the next JCC, current issues will be resolved, the activities will progress, and outputs will be stepped up to the point of achievement. As deputy mayor, I am in charge of various fields and it is difficult for me to be involved in all of them, but I would like to be proactive.

END

ANNEX I Participants of Seventh Joint Coordination Committee

ANNEX II Presentation of Progress Report 5, Monitoring Sheet9, Activity Plan
and Important Issue

ANNEX III PDM (ver. 1.8)

ANNEX I Participants of Ninth Joint Coordination Committee

	Name	Organization	Position
1	Mr. Tumurtumuu ZUNDUI	Ulaanbaatar City	Deputy Governor of Capital City in Charge of Social Sector, Green Development and Air and Environmental Pollution
2	Mr. Khishigdalai CHULUUN	Ministry of Mining and Heavy Industry, Fuel Policy Department	Head of Department
3	Ms. Mongolmaa D	Ministry of Mining and Heavy Industry, Fuel Policy Department,	Analyst of Standards, occupational safety and environmental issues
4	Mr. Gerelnyam B	Ministry of Road and Transport Development, Traffic Coordination Department	Head of Department
5	Mr. Buyannemekh.B	Ministry of Environment and Tourism, Environmental Policy Coordination Department	Director General
6	Mr. Munkhbat TSENDEEKHUU	Ministry of Environment and Tourism, Environmental Policy Coordination Department	Officer
7	Ms. Oyunchimeg BATJARGAL	Secretariat of the National Committee for Environmental Pollution Reduction	Senior specialist. Air pollution reduction
8	Mr. Enkhbat ERDENEBAT	Secretariat of the National Committee for Environmental Pollution Reduction	Air quality specialist
9	Mr. Batbayar JADAMBA	National Agency for Meteorology and Environment Monitoring Environment Monitoring Division	Head of Division
10	Mr. Barkhasragchaa BALDORJ	Central Laboratory of Environment and Metrology	Head of Environmental monitoring laboratory
11	Ms. Gerelmaa BAATARKHUU	Ministry of Finance, Development Financing Investment Department	Cooperate Adviser
12	Mr. Namuu N	Traffic Control Center of the Capital City, Traffic Control Division	Head of Division
13	Mr. Nyamsan G	Public Transport Department of the Capital City, Cargo and Logistics Division	Head of Division
14	Mr. Ganbold TSOG	Department of Against Air and Environmental Pollution of the Capital City	Head of DAAEP
15	Mr. Enkhmend A	Department of Against Air and Environmental Pollution of the Capital City, Air Quality Measurement and Operation Division	Expert
16	Mr. Ulziibat D	Tavan Tolgoi Tulsh LLC Engineering Department	Head of Department
17	Mr. Tokuji YOSHIMURA	JICA Mongolia Office	Senior Representative
18	Mr. Kousuke SHIDA	JICA Mongolia Office	Representative
19	Ms. Oyuntsetseg.CH	JICA Mongolia Office	National Staff
20	Mr. Toru TABATA	JICA Expert Team	Chief Advisor
21	Mr. Natsuji SAWAKI	JICA Expert Team	Deputy Leader
22	Mr. Atsushi SATO	JICA Expert Team	Group Leader of Auto-mobile Countermeasure
23	Mr. Hajime Endo	JICA Expert Team	Clean Coal Technology / Pilot Project for Improved Fuel 1

ANNEX II Presentation of Monitoring Sheet and Important Issue

Монгол улс Улаанбаатар хотын агаарын бохирдлын хяналтын чадавхыг бэхжүүлэх төсөл (3 дугаар үе шат) ХЗХ-ны 9 дүгээр хуралдаан 2023 оны 6 сар ЖАЙКА төсвийн баг	1.1 Үр дүн 1 Эх үүсвэрийн болон орчны агаарын хяналт шовхмлыг сайжруулах Хэрэгжлэхийн байдал (2022/12-2023.04) <u>Төг үйл ажиллагаа:</u> > НАОБТГ, НМХГ хамтран уламж: хийн хэмжээний хялбарчилсан аргачлалт (сөөгийн хэмжээгч /Levo 340/) нэрийгчилсэн өгөгчлөл (ЛК)-тай хэрэглүүлэх хэмжээнийг хийж байсан боловч НЗД-ын 2022 оны 12 сарын 30-ны өдрийн АЛ649 тоот захирахаар НМХГ-г тасал буулдаж, НАОБТГ-ын хэрэгжид хяналт шалгалтын хэргээ байгуулдсан. Иймд Монгол талтай зөвшицсөний үндсэн дээр тус үйл ажиллагааг зогсоосон. > АМТГТ-ын хэрэгж төв лабораторт нийлүүлсэн флуоресцент рентген хүтрийн анализаторыг ашиглан сар бүр шатлууун түгжээг шалгах дээж авч, хүтрийн асуулганд шовхонж байна. > АЧСХ-ын хэмжээгч анализаторын ажиллагаанд доголдол, гэмтэл гарах үед үйлдвэрлэгч болон дистрибьютерүүдээс техникийн засварчилгаа авахад туслалцаа үзүүлж байна. 2023 оны 2 сард японы үйлдвэрлэгчийн инженертэй олондлаар холбогдож НСК анализаторын гэмтлийг оношилж, засварын дагуу үзлэг томиргоо хийж засварласан. НАОБТГ, БОХСГЛ нь сайтар уялдаа холбоотой ажиллаж байна.
ХЗХ-ны 9 дүгээр хурлын зорилго 1. Явцын тайлан дугаар-5 (2022.06~2023.05) болон Гүйцэтгэлийн тайлан /Дугаар-9/-г батлах (2022.11~2023.04) 2. Тулгамдсан асуудал болон хэлэлцэх асуудал 2.1 Цаашид тулгамдаж буй асуудалтай холбоотой шаардлага 3. Япон талын саналыг монгол талтай хэлэлцэж, эцэслэн батлах 3.1 ТТМ-ын үр дүнгийн шалгуурыг өөрчлөх 3.2 ТТМ-ын үйл ажиллагааны агуулгыг өөрчлөх 4. 2023 оны 12 сарын ХЗХ-ны 10-р хуралдаан дээр хэлэлцэх асуудал	Үр дүн 1: Эх үүсвэрийн ялгарах, агаар орчны хяналт, шовхмлыг зогсоох сайжрах Хэрэгжлэхийн байдал (2022/11-2023.04) > 2022 оны 11-р сараас 2023 оны 1-р сарын хооронд Тэрэлжийн гур хурдны баазад сайжруулсан шовхон түрээсийн загвар төслийн үр дүнд бэлтгэлээр хяналтын туршилтыг хэрэгжүүлж, НАОБТГ-ын хяналт шалгалт байгуулсан агаарын агуулганыг хэмжсэн. > 2022 оны 12 сард хувийн хэвсгийн автобус компанид нэг автобусыг DPF-ийг шинэ түрэн суурилуулах болон жолооч шүүлтүүрийг хэвсгийн шаардлагатайг ойлгоогүйн улмаас ажилласан шүүлтүүртэй зүйл хийхгүй гэж, автобусны компанид уламж үзлэг бичиг хэргийг үйлдвэрлэгч, нэг загвар хийж байсан. Энэ нь засварыг нутагд, DPF суурилуулах хэргийг ажиллагааг орсон. <u>Ажиглах асуудал</u> □ DPF суурилуулах автобусны шинэчлэл, загвар үйлдвэрлэгч хэрэгжүүлж байсан, бусад загварыг засварлах болон жолооч нэг DPF-ийг шинэчлэлт шүүлтүүр шалгах замаар ажиллах, ажилласан шүүлтүүрийг хэвсгийн шүүлтүүрээр солих гм)-ийг зайлшгүй баримдахгүй зүйлийг сайтар танилцуулах, бүрэн ойлгохын шаардлагатай.
ХЗХ-ны 9 дүгээр хурлын зорилго 1. Явцын тайлан дугаар-5 (2022.06-2023.05) болон Гүйцэтгэлийн тайлан /Дугаар-9/-г батлах (2022.11-2023.04)	DPF-ын шилжүүлэн суурилуулалт (Zhongtong автобус) Тэмцэж ХЗХ-д шилжүүлэн суурилуулах ажилын хэл  Энгийн шилжүүл  DPF-ын шилжүүлэн суурилуулалт  Ажилласан шүүлтүүр шилжүүлэх  Ажилласан шүүлтүүр шилжүүлэх  Шүүлтүүр шилжүүлэх PM  Ажилласан шүүлтүүр PM

Хэрэгжилтийн байдал (2022/11-2023/04)

Голуйл ажллагаа: РМ-ын эх үүсвэрийн дүн шинжилгээ

- 2022 оны 12 сард РМ-ын хэмжээний найргалын шинэчилсэний бүтэн жэлийн сорц ажлын дуусч, 2023 оны 3 сард явцад хэмжээний найргалын шинэчилсэг дуусах ю.
- 2022 оны 11 сард олон улсын шинэчилсэний байгууллагын үйл ажиллагайг танилцаж, дадлагажик технологийн сургалтыг зохион байгуулсан.
- 2023 оны 4 сараа шинэчилсэний тоон өгөгдлийн алдааг засварлах, ресептор моделийн шилшлэл РМ-ын аж үүсвэрбйн нөлөөллийг гэдэрсбилсг сургалт, дадлагаажик хийсэн

Голуулж амжилтаар: Агуухансэнийн гэр хэлтэйн загварчлал

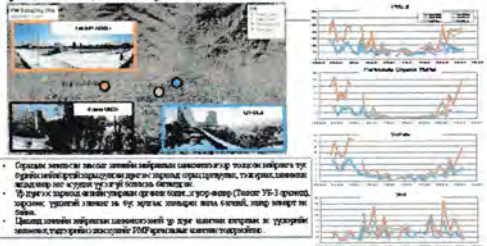
- Төлөөгөөсний дутуу 2021 оны агт аргаар тооцогдох (инвестор шлювички) ажил хийгдэх байрда ч хэ үүсгэсний мэдээний дутуу тоон өгөгдөл анда нэтийн урьмал нэжжэл кутада баардидж байна.
- Хөдөөгийн эрлэл болон замд хөдөөгийн нөөцөл байдлыг судалдаг, ахуйч хэрлөөгийн гэрлэн зуулал ашиглантны судалгааг түс бүр хэрлүүлж,
- 2023 оны 4 сард МУИС-г таргачтны загварлан ажиллуулж, тооцогдох дэглэа ажил сууралтай тохон байгуулж.

SO PM



- Сайруу-уулсн цагаалмал түгшээний хэрэгтэнэ бүтэн хэлээснээр, хуучин тууламал, хуучин FM₁₈ мн, агууламалын эхэн хува 62%-ыас 42% болж буурч, харин SO₂ мн агууламалын эхэн хува 64%-ыас 36%-д хүртэв оосон байна.

Үндсэн хэмжээний найрм агмон

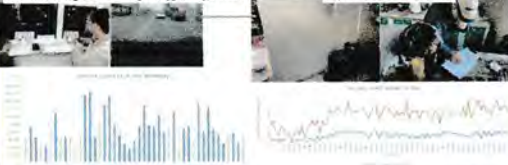


— — — — — — — — — —



- * 2023 оны 4 сард НАСБТТ, ЦЭОШГТ (ЦЭЦОСМХ), МУИС хяналт анхан дэргэд байгуулам: Тус тусгай УБ нэгж байгууламчид тусгайгай алдрын тооцоолол (монитор), агууламжийн тархалтын загварчлал боловсруулж, бичлэгдэж бүтүүлж ага хэлбэст үнэмтэй эхлэлт шалдарт анхан дэргэд орлогоот боловсрол тусгай өгсөн.
- * Одоогойг бийрмд, агууламжийн тархалтын загварчлал (Caloff model)-ийг агууламч чадалтай боловсрол хөгжсөдүгдэлтэй байж.

Хөдөлгөөний эрчим болон гэрлийн хурдны судалгаа



- [illegible]

Хэрэгжисний байдал (2022/12-2023/04)

Гол үйл ажиллагааг

- Япоки аваз сургуулигээр гүртүүк дэхижам зохицуулалтын технологийг эвэмжинэ, гүртүүк дэхижамыг асгалтын зузаалдманы гэрмээг нэмэгдүүлнэ, гүртүүк гэрмээ, бүтээл гэрмээг;
- Гүртүүк дэхижам зохицуулалтын төхөөрөмжийг гэрмээг асгалтын зузаалдманы гэрмээг нэмэгдүүлнэ;
- Нийгмийн тээврийн автобусуудад Баро-3 түрүүш хэрэгсэл, шалбаралтын талбар материал бүтээгдээ;
- Энэ жилд олон улсын ажиллагааг зохион байгуулсан нэгт 2 тээврийн хэрэгсэл бүтээгдээ;



Гэрыман дэманструе поўнае тэмпэраванне



Үр дүнгийн үзэсгээний уухалт

8
1240

[illegible]

10

[illegible]

1

123 Students in a classroom setting.

124 Students in a hallway.

125 Students in a classroom setting.

1

[illegible]

1

[illegible][illegible]

3.2 ТТМ-ын үйл ажиллагааны агуулгыг өөрчлөх

Ур дүн 1-ийн Үйл ажиллагаа 1-1

Одоогийн хувилбар	Өөрчлөх хувилбар
1-1 НАСБТГ, НМХГ нь утааны хийн хэмжээг тусгууран УХЗ-ны хяналт шалгалтыг сайжруулах	1-1 НАСБТГ, НМХГ нь утааны хийн хэмжээг тусгууран УХЗ-ны хяналт шалгалтыг сайжруулах #1 Байгалийн газар хэргийн 2020 оны 12-р сарын 30-ны өдөр А/1649 тоот захирамж "Нийслэлийн Мэргэжлийн хамтын хөтөн хийн хяналтын байршлын агуулгыг өөрчлөхөөр зориулсан ажиллагааг зохион байгуулах тухай" - НМХГ, НАСБТГ, НАСБТГ-н хяналт шалгалтын хэргийг хяналт байгуулах.
1-1-4 НМХГ нь ЖАЙКА-ны мөргөжлийн хэмжээг НМХГ-ны бичиг төсвийн хяналт шалгалт утга хийн хяналт шалгалтын хэргийн 2020 оны 12-р сарын 30-ны өдөр А/1649 тоот захирамж "Нийслэлийн Мэргэжлийн хамтын хөтөн хийн хяналтын байршлын агуулгыг өөрчлөхөөр зориулсан ажиллагааг зохион байгуулах тухай" - НМХГ, НАСБТГ, НАСБТГ-н хяналт шалгалтын хэргийг хяналт байгуулах.	1-2 НАСБТГ-н Хяналт шалгалтын хэргийг Ажлын төсвийн хяналт шалгалт - хийн хяналтын хэргийг хяналт шалгалтын хэргийн 2020 оны 12-р сарын 30-ны өдөр А/1649 тоот захирамж "Нийслэлийн Мэргэжлийн хамтын хөтөн хийн хяналтын байршлын агуулгыг өөрчлөхөөр зориулсан ажиллагааг зохион байгуулах тухай" - НМХГ, НАСБТГ, НАСБТГ-н хяналт шалгалтын хэргийг хяналт байгуулах.

Анхаарал тавьсанд баярлалаа

3.2 ТТМ-ын үйл ажиллагааны агуулгыг өөрчлөх

Ур дүн 3-ын Үйл ажиллагаа 3-2

Одоогийн хувилбар	Өөрчлөх хувилбар
3-2 ЭХЯ нь ЖАЙКА-ны мөргөжлийн хамтын хөтөн хийн хяналтын хэргийн 2020 оны 12-р сарын 30-ны өдөр А/1649 тоот захирамж "Нийслэлийн Мэргэжлийн хамтын хөтөн хийн хяналтын байршлын агуулгыг өөрчлөхөөр зориулсан ажиллагааг зохион байгуулах тухай" - НМХГ, НАСБТГ, НАСБТГ-н хяналт шалгалтын хэргийг хяналт байгуулах.	3-2 ЖАЙКА-ны мөргөжлийн хамтын хөтөн хийн хяналтын хэргийн 2020 оны 12-р сарын 30-ны өдөр А/1649 тоот захирамж "Нийслэлийн Мэргэжлийн хамтын хөтөн хийн хяналтын байршлын агуулгыг өөрчлөхөөр зориулсан ажиллагааг зохион байгуулах тухай" - НМХГ, НАСБТГ, НАСБТГ-н хяналт шалгалтын хэргийг хяналт байгуулах.

4. Цаашид төдөрхөйлөх агуулга (2023 оны 12 сарын ХЗХ-ны 10-р хуралдаан хүртэл)

Төсөл төлөвлөлтийн матриц (ТТМ)-ын эрхэм зорилгын* тоон шалгуурыг төдөрхөйлөх

Одоогийн хувилбар	Өөрчлөх хувилбар
1. Голлох эх үүсвэрүүдээс ялгарах бохирдуулах бодисын хэмжээ нь бууруулах төсөл, арга хэмжээ хэрэгжээгүй тохиолдолд (BAU case) - той харьцуулахад ХХ% илүү буурах.	1. Голлох эх үүсвэрүүдийн бохирдуулах бодисын ялгарах 2020 онтой харьцуулахад, PM хх%-иар, SO2 хх%-иар, тус бүр буурах.

УБ хотын өмнөд урванд асуудал болж буй PM, SO2-ыг БО-ны стандартын хэмжээнд хүргэхэд өмнөд хувилбар бууруулах шаардлагатай байгааг Ялалт талд судалж.

*Эрхэм зорилго нь төсөл дууссаны дараа 3-5 жилийн дараа бэлтгэх зорилго

Output 4: Decision making process for air pollution control is improved by utilizing the Professional agencies including DAAEP, NAMEM and the relevant agencies.	4-1. Analysis of air pollution status, short-, medium- and long-term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned) are presented to decision makers at least 2 times.	1. The Project reports 2. Reports on NPREP
	4-2. Results of pilot project implementation and other Project results are utilized for the revision of NCEPR and for decision making on implementation/non-implementation of pollution control measures at least once.	
	5-1. At least three pilot projects selected by C/P-WG are implemented	
	5-2. The results of each pilot project (emission reduction, improvement of ambient air quality and population exposure for PM, SO ₂ and NO _x) are presented to the relevant agencies.	
Output 5: Air pollution control measures are enhanced for PM, SO ₂ and NO _x emission reduction at major sources.	6-1. At least three of drafts on laws and regulations, such as fuel regulations, MNS emission standards and ordinances of UB City, are submitted.	1. The Project reports
	6-2. More than 3 air pollution control measures and technologies are funded by the sections of the relevant agencies in charge of allocating funds for air pollution control by utilizing technical appraisal guideline provided by the Project.	
	6-3. At least three agreements are made on demarcation of roles of the relevant agencies for air pollution control measures in the Project.	
	6-4. The operational guideline is distributed to relevant agencies.	
Output 6: Legal framework, resource allocation and coordinating mechanism as a Platform for the Air Quality Management Cycle are strengthened for the Outputs 1 to 5.	1-1-1 DAAEP and IACC ¹ reinforce HOB inspections based on on-site stack gas measurements.	1. Laws and regulations, fuel regulations, MNS emission standards and ordinances of UB City 2. Minutes of Meeting of NCEPR 3. Official documents including UB city Governor's orders 4. Operational guideline
	1-1-2 DAAEP and JICA Experts assess the technical transfer on-site stack gas measurement.	
	1-1-3 IACC and the relevant agencies with JICA Experts implement HOB inspection based on on-site stack gas measurement.	
	1-1-4 IACC with JICA Experts introduces simplified measurement method by using IACC's portable gas measurement equipment including parallel measurement with JIS method, elaboration of manuals and manufacturer's calibration. ²	

Activities		Inputs	
1-1 DAAEP and IACC ¹ reinforce HOB inspections based on on-site stack gas measurements. 1-1-1 DAAEP and JICA Experts assess the technical transfer on-site stack gas measurement. 1-1-2 DAAEP with JICA Experts re-constructs 2 teams of stack gas measurement. 1-1-3 IACC and the relevant agencies with JICA Experts implement HOB inspection based on on-site stack gas measurement. 1-1-4 IACC with JICA Experts introduces simplified measurement method by using IACC's portable gas measurement equipment including parallel measurement with JIS method, elaboration of manuals and manufacturer's calibration. ² 1-1-5 DAAEP and IACC with JICA Experts elaborate emission measurement reports. 1-2 TPP3 and TPP4 with JICA Experts enhance emission gas control by utilizing CEMS. 1-2-1 TPP3 and TPP4 with JICA Experts elaborate and implement CEMS operation and maintenance plan. 1-2-2 TPP3 and TPP4 with JICA Experts perform quality control of emission gas data of CEMS. 1-2-3 TPP3 with MET and the relevant agencies elaborate online emission data reporting system for the CEMS. 1-2-4 NAMEM and the relevant agencies share and evaluate CEMS emission data. 1-2-5 NAMEM compiles monitoring data of emissions from TPP2, TPP3, TPP4 and new large heat supply facilities and share them with relevant agencies.	Japanese side 1. JICA Experts (necessary fields) (1) Chief Advisor (2) Air Pollution Control Planning and Policy (3) Emission Measurement for Stationary Sources (4) Ambient Air Quality Monitoring (5) Ambient Air Quality Analysis (6) PM10 and PM2.5 Sampling (7) PM10 and PM2.5 Apportionment Study (8) Emission Inventory (Stationary, Mobile and Others) (9) Air Quality Simulation Modeling / Air Pollution Control Measures Evaluation (10) Auto-mobile Emission Control 1 (Traffic Signal Control) (11) Auto-mobile Emission Control 2 (RSD and others) / Emission	Mongolian side 1. C/P and C/P-WG (1) JCC Chairperson (2) JCC Vice-Chairperson (3) Project Director (4) Project Manager (5) Necessary C/P and C/P-WG staff according to the fields of JICA Experts 2. Facility (1) Provision of necessary office space in DAAEP and MET (including internet access) (2) CLEM Laboratory (3) Storage Space for Equipment 3. Local cost (1) Counterpart expenses such as salary, allowance, travel cost and accommodation (2) Project administrative expenses	1. There are no frequent leaves, transfers or resignations of C/P and C/P-WG members. 2. Necessary coordination among UB city, districts, khoroos and communities in Ger area is secured by Mongolian side for implementation of pilot projects.
1-3 MRTD and PTD introduce relevant regulations of vehicles based on emission measurement. 1-3-1 MRTD and PTD with JICA Experts implement vehicle measurements by RSD, assess distribution of vehicles emission intensity and define target vehicles to be regulated. 1-3-2 MRPA and IACC with JICA Experts implement automobile fuel surveys. 1-3-3 JICA Experts conduct training to NRTC, in addition to DAAEP, on vehicle emission measurement using on-board emission measurement system, and DAAEP and NRTC implement vehicle emission measurement using on-board emission measurement system. 1-3-4 Public Transportation Department of the Capital City with JICA Expert transfer the DPF which were installed on 24 large buses by the project "Verification Survey with the Private Sector for Disseminating Japanese Technologies for Emission Reduction of Particulate Matter (PM) from Diesel Buses by DPF" to other buses.			

1-4 DAAEP and NAMEM with JICA Experts strengthen AQMS utilization. 1-4-1 CLEM and JICA Experts assess the current status of equipment in reference laboratory of CLEM and identify necessary actions if necessary. 1-4-2 DAAEP reinforces AQMS operation and maintenance based on the plan by Phase 2. 1-4-3 DAAEP with JICA Experts starts air quality monitoring at pilot project area for improved household fuels by utilizing mobile AQMS. 1-4-4 DAAEP with JICA Experts reinforces the AQMS at Bayankhoshuu station. 1-4-5 DAAEP and NAMEM with JICA Experts implement parallel measurement by FRM sampler for PM concentration, and implement quality control of PM measurements of AQMS. 1-4-6 DAAEP and NAMEM with JICA Experts maintain the online information system of AQMS. 1-4-7 DAAEP and NAMEM share real-time monitoring data with the relevant agencies through the online information system. 1-4-8 DAAEP and CLEM with JICA Experts analyze air quality monitoring data and elaborate air quality monitoring reports. 1-4-9 The relevant agencies utilize air quality monitoring data. 1-4-10 DAAEP with JICA Experts establishes the data transfer system of air quality monitoring data of Dambadarjaa station to the online information system of AQMS. 2-1 NAMEM and JICA Experts conduct PM apportionment study based on PM speciation throughout the year. 2-1-1 CLEM and JICA Experts elaborate PM sampling plan throughout the year, and implement PM samplings. 2-1-2 JICA Experts perform PM speciation analysis in Japan. 2-1-3 NAMEM and CLEM with JICA Experts learn PM speciation technologies (ion analysis, element analysis and carbon analysis). 2-1-4 NAMEM and CLEM with JICA Experts formulate equipment and laboratory plan for PM speciation. 2-1-5 DAAEP and NAMEM with JICA Experts perform PM apportionment study based on receptor modeling. 2-2 DAAEP and NAMEM with JICA Experts evaluate air pollution structure and health impact based on air quality simulation model and receptor model. 2-2-1 DAAEP and NAMEM elaborate plans for updating emission inventory. 2-2-2 DAAEP, TCC and PTD implement studies for mobile sources including update of emission inventory, examination of traffic signal control, traffic volume and vehicle traveling speed. 2-2-3 DAAEP and JICA Experts select the pilot areas and assess Ger stoves usage pattern (type and model of stoves, seasonal pattern of usage, insulation of Ger housing and coal consumption). 2-2-4 DAAEP and NAMEM with JICA Experts implement studies for other emission sources as necessary. 2-2-5 DAAEP and NAMEM with JICA Experts elaborates BAU (Business as usual) scenario for the future year based on TPPs future development plans, projection of number of vehicle, population, economic growth, emission regulation, fuel quality regulation and so on. 2-2-6 DAAEP and NAMEM update emission inventory for the present year and the future year for the BAU scenario. 2-2-7 DAAEP and NAMEM update the air quality simulation model for PM10, SO₂ and NO_x. 2-2-8 DAAEP and NAMEM evaluate the air pollution structure of UB city. 2-2-9 DAAEP and NAMEM evaluate indicative population exposure of PM10 based on population weighted concentration and so on. 3-1 DAAEP and the relevant agencies elaborate a draft MNS on an emission measurement method of improved fuel and fuel quality, and propose it to MASM. 3-2 JICA Experts collect information about fuel gas usage in Mongolia, elaborate safety standards for gas based on Japanese experiences, and then submit it to Ministry of Energy. 3-3 DAAEP and the relevant agencies elaborate implementation plans and terms of reference for pilot projects such as improved fuel, HOB, traffic signal control, eco-driving, RSD, smoke belching program based on portable emission device, DPF, low sulfur fuel and low emission vehicles.	Measurement 2 (12) Clean Coal Technology for Air Pollution Control Measures (13) CEMS Data Analysis (14) Stationary Source Emission Control Measures (15) Air Quality Administration (16) Public Awareness and Public Relations 2. Training (1) Local seminars and workshops (2) Training course in Japan 3. Provision of necessary equipment 4. Local cost Necessary expenses for activity of JICA Experts
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4-1 DAAEP and NAMEM submit to the decision makers the analysis of air pollution status, short-, medium- and long-term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned). 4-2 Relevant agencies with pilot projects elaborate technical guidelines and utilizes them. 4-3 The relevant agencies discuss and endorse the selection of pilot projects. 4-4 NCEPR and the relevant agencies approve large scale investments based on pilot projects implementation and assessment. 4-5 NCEPR, or the sections of the relevant agencies in charge of allocating funds for air pollution control in the Mongolian government such as the Environment and Climate Fund utilizes the Outputs of the Projects and pilot projects implementation and assessment.	
5-1 DAAEP with Health Department of Capital City and the relevant agencies implements public awareness and advisory activities for citizens including school students and parents. 5-2 MET and DAAEP publish progress of the Project by newsletter, newspaper articles, web-site and other medias. 5-3 DAAEP and JICA Experts provide technical guidance to manufacturers for improved fuel production. 5-4 The relevant agencies with JICA Experts implement pilot projects according to the implementation plan by Activity 3-3. 5-5 The relevant agencies with JICA Experts evaluate pilot projects results in terms of emission reduction, air quality improvement and exposure to citizens, and extract lessons learned. 5-6 The relevant agencies with JICA Experts report the pilot projects results to NCEPR. 5-7 TPP3 and TPP4 analyze CEMS data, and examine viable air pollution control measures. 5-8 TPP3 and TPP4 with JICA Experts elaborate emission reduction plans.	
6-1 The relevant agencies discuss and elaborate written agreements on demarcation of roles in air quality management related with each Output and Activity of the Project. 6-2 DAAEP with JICA Experts submits technical documents to NCEPR for improved fuel standard, emission standard on stationary sources, mobile sources and other emission sources, and revision of ordinance. 6-3 NCEPR and the relevant agencies elaborate fuel standard and emission standard, and submit them to MASM. 6-4 Relevant ministries / relevant agencies of UB city elaborate laws, regulations and ordinances on air pollution control measures, and submit them to national parliament / city council. 6-5 JICA Experts provide training on air pollution control measures and technical appraisal guidelines for staff of the sections of the relevant agencies in charge of allocating funds for air pollution control. 6-6 Staff of the sections of the relevant agencies in charge of allocating funds for air pollution control with JICA Experts improve relevant operations with allocating funds for air pollution control measures, if necessary. 6-7 Mongolian side enhances donor coordination in air pollution control. 6-8 Relevant agencies of pilot projects with JICA Experts develop an operational guideline for elaboration, implementation and evaluation of air pollution control measures based on pilot projects implementation.	Pre-conditions 1. Appropriate number of qualified staff of C/P and C/P-WG is assigned. 2. Adequate amount of budget related with the Project implementation is secured. 3. Necessary human resources mobilization related with pilot projects is secured by Mongolian side.

*1 According to Mayoral Order A/1649 "Partial Measures Related to the Abolition of Inspection Agency of the Capital City" dated December 30, 2022, Audit Division was added to DAAEP.

*2 Since the Audit Division and the Air Quality Measurement and Operation Division of DAAEP do not perform simplified measurement, Activity 1-1-4 was terminated through December 30, 2022.

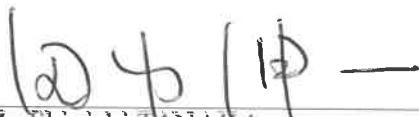
AQMS: Air Quality Monitoring Station
BAU: Business as Usual
CEMS: Continuous Emission Monitoring System
CFWH: Coal Fired Water Heater
C/P: Counterpart
C/P-WG: Counterpart Working Group
DAAEP: Department of Against Air and Environmental Pollution of Capital City
DPF: Diesel Particulate Filter
FRM: Federal Reference Method
HOB: Heat Only Boiler
IACC: Inspection Agency of the Capital City
MASM: Mongolian Agency for Standardization and Metrology
MET: Ministry of Environment and Tourism
MMHI: Ministry of Mining and Heavy Industry
MNS: Mongolian National Standard
MRPA: Mineral Resources and Petroleum Authority
MRTD: Ministry of Road and Transport Development

MINUTES OF MEETING OF
THE TENTH JOINT COORDINATING COMMITTEE MEETING
ON JAPANESE TECHNICAL COOPERATION FOR
CAPACITY DEVELOPMENT PROJECT FOR AIR POLLUTION CONTROL IN
ULAANBAATAR CITY PHASE 3 in MONGOLIA

The Japan International Cooperation Agency (hereinafter referred to as "JICA") Supervisory Team for "Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3 in Mongolia (hereinafter referred to as "the Project"), JICA Mongolia Office, and JICA Expert Team (hereinafter referred to as "JET") had a series of meetings with the Department of Against Air and Environmental Pollution of Capital City (hereinafter referred to as "DAAEP"), Ministry of Environment and Tourism (hereinafter referred to as "MET") and Joint Coordinating Committee (hereinafter referred to as "JCC") members from 29th November to 8th December 2023 to discuss the Monitoring Sheet 10, and the tenth JCC meeting of the Project was chaired by Mr. Batshagai, Director of DAAEP, as acting Chairperson on 8th December 2023. Participant list of the tenth JCC meeting is shown in Annex I.

As a result of discussions, both sides agreed on matters referred to the document attached hereto.

Ulaanbaatar, 8th December 2023



Mr. Shinichi TANAKA
Chief Representative
JICA Mongolia Office
Japan International Cooperation
Agency, Japan



Ms. Nominchimeg ODSUREN
Deputy Governor of Capital City
in Charge of Social Sector, Green
Development and Air and
Environmental Pollution



Mr. Toru TABATA
Leader, JICA Expert Team, Japan



Mr. Chimidsuren CHOIGUNSEN
Director General, Department of
Development Financing and Public
Investment of Ministry of Finance,
Mongolia

ATTACHED DOCUMENT

I. Project Monitoring Sheet 10

JET explained the progress of the Project, future plan, and issues that the Project is facing since its beginning. After active discussions, the JCC approved the Project Monitoring Sheet 10.

II. The Project Design Matrix

The Japanese side proposed the following revisions of the Project Design Matrix (hereinafter referred to as PDM).

1. Indicator of the Overall Goal

Mr. Sawaki, Vice Leader of the JET, asked for opinions regarding description on the indicator of the Overall Goal of PDM. Mr. Batshagai, Director of DAAEP, and Mr. Unurbat, Expert of National Agency for Meteorology and Environment Monitoring (hereinafter referred to as "NAMEM"), proposed to set December 2016 as the base year, since the National Program for Reducing Air and Environmental Pollution, 2017-2025 sets its target as 80% reduction of ambient air concentration by 2025 compared with 2016. They also proposed to use the amount of reduction of ambient air concentration as the indicator, not emission, since the NAMEM reports set the target using ambient air concentration.

Mr. Davaajargal, Head of Air Quality Management Division of DAAEP, proposed to add PM2.5 as a pollutant to be evaluated.

Mr. Maeshima, JICA Supervisory Team, mentioned that the Overall Goal should be achieved in several years (three years in JICA's evaluation system) after the completion of the project, through the own efforts of the Mongolian side. If the target goal could not be achieved, it would be considered that the project did not work well. Since the ambient air concentration is more uncontrollable than the emission, the target was initially set at an emissions amount, which could be estimated based on the effects of the pilot projects.

Understanding this point, the Japanese side would like the Mongolian side to carefully consider whether they want to set the target for either ambient air concentration or emission amount.

Mr. Batshagai, Director of DAAEP, concluded that he would like to ask everyone to consider whether to use ambient air concentration or emission amount, and then decide the description of the indicator of the Overall Goal at the next JCC meeting.

2. Objectively Verifiable Indicators of the Project Purpose

The Japanese side and Mongolian side discussed what constitutes the three indicators of the achievement of the project purposes.

Regarding the Objectively Verifiable Indicators 2, Mr. Yoshimura, Senior Representative of JICA Mongolia Office, suggested that the signal control and decrease in police intervention at crossroads should be quantitatively described, as requested in the previous meeting with Japanese consulting team repeatedly. He mentioned that it was hard to see positive effects of reduction of traffic congestion nor reduction of intervention by police officers at crossroads in his daily life in Ulaanbaatar City (hereinafter referred to as "UB City").

Mr. Namuu, Head of Traffic Control Division of Traffic Control Center, replied that they tested changing the signal lighting time at 11 out of the 17 major intersections in UB City, utilizing the knowledge and experience learned in the training program in Japan. The Center was able to confirm that simply changing the mode of the signal from 3 to 5 seconds was effective in the pilot project. Residents might hardly notice the effect of the change for the most part because the volume of cars is too large for the limited capacity of the roads in UB city. Even so, the Center has found that signal control actually works, confident to intervene in traffic flows by adjusting the signals. The Center is planning to issue a mayoral order regarding the update of efficient signal control.

III. Comments from the Mongolian side of the issues on the future project activities

Mr. Luvsantseren, Director General of the Department of Fuel Policy Implementation and Coordination, the Ministry of Energy, suggested that the project should publicize its outputs more actively to Ulaanbaatar citizens in cooperation with UB City and the MET. There was a recommendation from the project that desulfurizer should be added in the improved fuel, and then Tavan Tolgoi Tulsh LLC (hereinafter referred to as "TTT") introduced desulfurizer on a trial basis, which has been effective so far. However, there have been some complaints pointing out the desulfurizer used at UB City is not so effective. Publicizing the effects of the desulfurizer and the fuel conversion to Euro 5 based on scientific evidence and measurement results will help introducing the outputs of the project. It will also prove that the Mongolian side is taking measures based on the evidence. Publication of the outputs of the project will be important for the remainder of the project period.

IV. Comments from the Japanese side of the issues on the future project activities

Mr. Yoshimura, Senior Representative of JICA Mongolia Office, asked the Mongolian side to express their position at this meeting regarding the four issues pointed out in the presentation, and requested to follow up the issues thoroughly after this meeting. The four issues are;

1. Promotion of Euro 5 fuel
2. Transfer of Diesel Particulate Filter (hereinafter referred to as "DPF")

3. Continuity of organization on the Mongolian side
4. Continuity of Human resources of the counterparts

At the end of the meeting, Mr. Takiguchi, the Leader of JICA Supervisory Team, mentioned the following two points;

1. The project is scheduled to end in July 2024, which is about a half year left away. Efforts made during these six months will largely determine the success of the project. The final seminar in April 2024 will be very important in this sense. Therefore, presentations by the Mongolian side at the seminar will be highly appreciated.
2. Air pollution in Mongolia is still serious, with particularly high concentration of SOx and PM. Countries that have suffered from air pollution, including Japan, have followed the path of reducing SOx at first and then taking measures for other pollutants. Therefore, it is highly recommended to take measures against SOx at first.

END

ANNEX I Participants of Tenth Joint Coordination Committee

ANNEX II Presentation of Monitoring Sheet 10, Task outline and Important Issue

ANNEX I Participants of Tenth Joint Coordination Committee

	Name	Organization	Position
1	Ms. Bolorjargal (Substitute)	Ministry of Environment and Tourism Environment Resource Operation Department	Expert
2	Ms. Mongolmaa D.	Ministry of Mining and Heavy Industry, Fuel Policy Department	Head of Department
3	Ms. Gerelmaa	Ministry of Finance, Development Financing Investment Department	Adviser
4	Mr. Luvsansuren I.	Ministry of Energy, Department of Fuel Policy Implementation and Coordination	General Director
5	Mr. Javzansuren D.	Ministry of Energy, Department of Fuel Policy Implementation and Coordination	Expert
6	Mr. Perenlee Kh.	Ministry of Energy, Department of Fuel Policy Implementation and Coordination	Expert
7	Ms. Tergel Sh. (Substitute)	National Committee for Environmental Pollution Reduction	Expert
8	Ms. Enkhmaa	National Agency for Meteorology and Environment Monitoring	Expert
9	Mr. Unurbat	National Agency for Meteorology and Environment Monitoring	Expert
10	Mr. Gantulga B.	Mayor's Office, Investment Division	Head of Division
11	Mr. Baldandorj M.	Mayor's Office, Engineering Facility Division	Head of Division
12	Mr. Ulzii E.	Public Transport Department of the Capital City	Head of Division
13	Mr. Barkhasragchaa B.	Central Laboratory of Environment and Metrology	Head of Environmental monitoring laboratory
14	Mr. Batshagai B.	Department of Against Air and Environmental Pollution of the Capital City	Director
15	Mr. Davaajargal	Department of Against Air and Environmental Pollution of the Capital City, Air Quality Measurement and Operation Division	Head of Department
16	Mr. Enkhmend A.	Department of Against Air and Environmental Pollution of the Capital City, Air Quality Measurement and Operation Division	Expert
17	Mr. Adiyaochir	Department of Against Air and Environmental Pollution of the Capital City, Air Quality Measurement and Operation Division	Expert
18	Mr. Khuvizaya Ch.	Traffic Control Center of the Capital City	Director
19	Mr. Namuu N.	Traffic Control Center of the Capital City, Traffic Control Division	Head of Division
20	Mr. Tokuji YOSHIMURA	JICA Mongolia Office	Senior Representative
21	Ms. Hiroka WATARAI	JICA Mongolia Office	Project Formulation Officer
22	Ms. Oyuntsetseg CH	JICA Mongolia Office	National Staff
23	Mr. Hiroaki TAKIGUCHI	JICA Global Environment Department Environmental Management and Climate Change Group / JICA Supervisory Team	Senior Advisor
24	Mr. Koji MAESHIMA	JICA Global Environment Department Environmental Management and Climate Change Group / JICA Supervisory Team	Deputy Director
25	Mr. Toru TABATA	JICA Expert Team	Leader
26	Mr. Natsuji SAWAKI	JICA Expert Team	Vice Leader
27	Mr. Ei EDO	JICA Expert Team	Chief Sub Group Leader / PM10 and PM2.5 Apportionment Study / Ambient Air Quality Analysis
28	Mr. Atsushi SATO	JICA Expert Team	Group Leader of Auto-mobile Countermeasure
29	Mr. Sho FUKUCHI	JICA Expert Team	Public Awareness/Public Relation/Project Coordinator

ANNEX II Presentation of Monitoring Sheet 10, Task outline and Important Issue

Монгол улс Улаанбаатар хотын агаарын бохирдлын
хяналтын чадавхыг бэхжүүлэх төсөл
(3 дугаар үе шат)

ХЗХ-ны 10 дугаар хуралдаан

2023 оны 12 сар
ЖАЙКА төслийн баг

ХЗХ-ны 10 дугаар хуртын зорилго

- 1 Явцын тайлан (Гүйцэтгэлийн тайлан /Дугаар-10-г батлах (2023.05 ~2023.10)
- 2 Өнөөгийн байдал, тулгамдсан асуудал
- 3 ХЗХ-ны 10 дугаар хурлаар магадлах асуудал

ХЗХ-ны 10 дугаар хурлын зорилго

- 1 Явцын тайлан (Гүйцэтгэлийн тайлан /Дугаар-10-г батлах (2023.05 ~2023.10)

Тойм

- Төслийн хугацаа: 2018 оны 11 сарас 2024 оны 7 сар хүртэл.
- ХЗХ-ны 10-р хурлаар хяналтын агуулгын нэмрэх хугацаа: 2023 оны 5 сарас 2023 оны 11 сар хүртэл.

1.1 Үр дүн 2: Агаарын бохирдлын бүтцийн шинжилгээ, үнэмлэхүй чөлөөх сайжрах

Төсөлсүрэн хяналтын агаарын бохирдлын бүтцийн шинжилгээний дүн. Түүнийг дүрвэлд оруулж байгаа өөрөөр болон зэрэгцээ

сэлтэнгээр харуулж байна. 2023 оны 12 сарын 31-ний өдөр ХЗХ-ны 10 дугаар хуралдаан болж, түүнийг батлах болно.



1.1 Үр дүн 2: Агаарын бохирдлын бүтцийн шинжилгээ, үнэмлэхүй чөлөөх сайжрах
Төсөлсүрэн хяналтын агаарын бохирдлын бүтцийн шинжилгээний дүн. Түүнийг дүрвэлд оруулж байгаа өөрөөр болон зэрэгцээ сэлтэнгээр харуулж байна. 2023 оны 12 сарын 31-ний өдөр ХЗХ-ны 10 дугаар хуралдаан болж, түүнийг батлах болно.

1.1 Үр дүн 2: Агаарын бохирдлын бүтцийн шинжилгээ, үнэмлэхүй чөлөөх сайжрах

УБ хотын 2021 он болов БАУ нунтаггүй тулгуурласан 2030 оны алгарлын индекс

2021 оны 12 сарын 31-ний өдөр ХЗХ-ны 10 дугаар хуралдаан болж, түүнийг батлах болно.



1.1 Үр дүн 2: Агаарын бохирдлын бүтцийн шинжилгээ, үнэмлэхүй чөлөөх сайжрах
Төсөлсүрэн хяналтын агаарын бохирдлын бүтцийн шинжилгээний дүн. Түүнийг дүрвэлд оруулж байгаа өөрөөр болон зэрэгцээ сэлтэнгээр харуулж байна. 2023 оны 12 сарын 31-ний өдөр ХЗХ-ны 10 дугаар хуралдаан болж, түүнийг батлах болно.

1.3 Загвар төсөл (Үр лүн 3, 4, 5), шийдвэр гаргах түвшинг эхлэмж гаргах (Үр лүн 6)
Үйл ажиллагааны хэрэгжилт (2023.5-2023.11)

Footnote 1

- [illegible]

THE UNIVERSITY OF CHICAGO PRESS

- [illegible]

(1) Сайжруулсан шахмал түлш

(2023 оны 5 сараас 11 сард хэрэгжүүлсэн үзл)



(Yüksek lisans)

Билимдүү мамлекеттик тунд (БМТ)-ний байгаль ортны жана жашыл билимдүү мамлекеттик тунд (БМТ) болуп, уйымдардын өткөч жана ташкындын үлүштүгүндө газороймундун шайыш болуусуна жана билимдүү мамлекеттик тундун каттаа референт материалын болоочуруна

(С. 100-101)

- [illegible]

(1) Сайжруулсан шахмал түлш

ΣΥΝΤΑΚΤΙΚΟ

Үлэмсэтт зүүх.

БҮТ нь нонхо (газ агаарын) чатвар сайтай, озоогийн ТТТ компаний сайжруулсан тулхээс температурын өсөлт хурдан Тоос \$0.2 NO-ийн алтартай жүүтээж багатай

Хүснэгт 1. БНТ-ийн үндэсний түүхийн инновацийн туршилтын зүйлс
2021 оны 4 сар хүртэл. НАСБН-ийн өргөтгөл лаборатори

	FTT age										BCE			
											CDD (100%)			
											CDD (100%)			
	1000-1099	1100-1199	1200-1299	1300-1399	1400-1499	1500-1599	1600-1699	1700-1799	1800-1899	1900-1999	2000-2099	2100-2199	2200-2299	2300-2399
Conductor	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
Preparation	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
after LC	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
intervention of 1/2	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300

Хялгдал утааны зайнаас хэмжигч
(Remote Sensing Device (RSD))

- [illegible]



1961-1962 25-4000 4000 2150

(3) Хүхэр багатай шатахууны хэрэглээг нэмэгдүүлэх

Знаменитый русский биолог и зоолог Н. С. Павлинов, автор
большого труда по истории зоологии в России, писал: «Величайшая
благословенная заслуга России — это то, что она была родиной

- Евро 5 харгалзан 100 евро дэвсгэр нь төсвийнхөө
→ Евро 5 хатуулаг нь нэгдсэн тухайнхыг хүргэж
агуулахыг багасгахгүй 1 жиливснийх дотор SO₂-ын
хатуулаг нь өрхийг тухайн хатуулагын багасгах
хатуулаг: IX-н өрхийнхөөгөөр 20 жиливснийх
хатуулагын IX-н 280 жиливсний багасгах

2. Хүргийн өмнөр агуулсан автомашинд туулах нөлөө
Бөхийн ихэнхийн форсуик. Ог мэргэж. А.Г мэргэж.
хүүрэн ил аялал хийлтийнхний нийрэл
Дэлгэр мөмийн форсуик, жинхэнэийн хийлтийнхний. Д.
мөмийн SCR, ил бүхийн мэргэжүүд мүүнэл



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Хүрэр иргэйд тулш ашигтай нь төрөөсийн тохиргооны засвар үйлчилгээнд гадна эвлэрн, мунхын сэвэн хэрэгсэлд санхүү ашигтайтай болжог үүрэг ашигтайтай болжог.

(4) Гэртэн дохнон зохицуулалтыг сайжруулах
арга хэмжээний үнэлгээ

THESE RESULTS ARE IN ACCORD WITH THE FINDINGS OF OTHER STUDIES.



- [illegible]

1.3. Зорилгын биеэлтийн байдал

Tema dan subtema	Isi materi pokok dan subpokok bahasan
Teknik pengolahan air Subtema 1: Sumber air 1.1.1. Definisi sumber air 1.1.2. Jenis-jenis sumber air 1.1.3. Kualitas sumber air	Subtema 1: Sumber air 1.1.1. Definisi sumber air 1.1.2. Jenis-jenis sumber air 1.1.3. Kualitas sumber air 1.1.4. Cara pengolahan air 1.1.5. Cara pengolahan air
Subtema 2: Cara pengolahan air 2.1.1. Definisi cara pengolahan air 2.1.2. Jenis-jenis cara pengolahan air 2.1.3. Cara pengolahan air	Subtema 2: Cara pengolahan air 2.1.1. Definisi cara pengolahan air 2.1.2. Jenis-jenis cara pengolahan air 2.1.3. Cara pengolahan air 2.1.4. Cara pengolahan air
Subtema 3: Cara pengolahan air 3.1.1. Definisi cara pengolahan air 3.1.2. Jenis-jenis cara pengolahan air 3.1.3. Cara pengolahan air	Subtema 3: Cara pengolahan air 3.1.1. Definisi cara pengolahan air 3.1.2. Jenis-jenis cara pengolahan air 3.1.3. Cara pengolahan air 3.1.4. Cara pengolahan air

1.4. Үр дүнгийн биелэлтийн байдал

[illegible]

1.4. Үр дүнгийн биелэлтийн байдал

[illegible]

1.5 Цаашдын төлөвлөгөө

- 2023 оны 12 сард РМГ хэмжээгтэйний дунгийн тайлан семинарыг зохион байгуулах
- 2024 оны 4 сард нэгдсэн семинар (монгол тал итгэлтэвч) зохион байгуулах
- 2024 оны 5 сард ХХҮ-ы 11 дүгээр хуралдны зохион байгуулах, төслийн эцсийн тайлан гаргах
- 2024 оны 6 сарын эхээр эхөн мэргэжилтний монголд ажиллах сүүлийн томилоо хийгдэх
- 2024 оны 7 сард ЖАЙКА Монгол дах төлөөлөгчийн газраас төслийн эцсийн тайланг НАОБТ болон БОАЖЯ-ил тараах
- 2024 оны 7 сарын 30-ны өдөрөө төсөл эцэслэн дуусгах

Анхаарах тавьсанд баярзалаа

Монгол улс Улаанбаатар хотын агаарын бохирдлын
хяналтын чадавхыг бэхжүүлэх төсөл
(3 дугаар үе шат)

ХЗХ-ны 10 дугаар хуралдаан

Асуудал, санал

2023 оны 12 сар
ЖАЙКА төслийн бэл

ХЗХ-ны 10 дугаар хурлын зорилго

Өнөөгийн байдал, тулгамдсан асуудал

2. ӨНӨӨГВИЙН ТУЛГАМЗСАН АСУУДАЛ

2.1 Сайжруулсан шахмат түлшний хялгат утааны хэмжлтийн стандарттай холбоотой асуудал (Үр дүн 3 Ү/а 3-1)

【Өнөөгийн ойлголт】

- * Сайжруулсан түлшний шинж чанарыг MNS5679:2012 стандартаар тогтоосон.

[Асуудал]

- НАОБТ-ын тэтг. ялагдлын туршигын лабораторид сэйжруулсан түлшний утааны хийн хэмжээт хийж, ялагдлын үеийн утааны хийн агууламжийг үнэмж байгаа ч хэмжээгийн аргачлалын стандарт бэйгүй байна.

【Анах арга хэмжээний санал】

- Төсөл нь УБ хотын хамруулсан учраас эхний ээлжинд нийслэлийн түвшинд сайжруулсан түвшний хэмжээний аргачлалын стандартыг тодорхойлж, нэмгдэл утсын хэмжээнд мөрдөх байдлаар хэрэгжүүлэх нь зүйтэй гэж үзэж байна.

- Төслийн бэлтгэл НАОБГ-ийн хамтран сайжруулсан гүйцэтгэл утааны хийн хэвсгэлтийн эргэцлэлийн стандартын саналыг боловсруулж, Хотын стандарт, хяналтын газарт албан ёсоор хүргүүлжээ. Цаашдаа 2024 оны 4 сард багтаан тус стандартыг батлахад амжилт, хэрэгжлэлийн хангаж ажиллахыг хүсч байна.

2.2 Хүхэр багатай түлш нэвтрүүлэхэд тулгамдаж буй асуудал

(1) Өмөөрний 52033.7

- Анхрын тухай хууль, Евро-5-аас доогуур хэрэгсэлийн шатхуулыг хяналтгүйгээр борлуулжгүй" гэж насаа боловч хэрэгсэлтэй хяналтгүй бүхэл ангиллын шатхуулыг түрхүү хэрэглэж байгаа
- 2013 оны 1 сараас ЗНУ-ын парк шинэчлэл Евро-5 (техник зүйн үзүүлэлтгүй гэсэн) стандартын 112 автобус нийлэгджээ гэнэ

- Евро 3 автобуснаад Евро 5 түвшин хэрэгжих шаардлагатай (хүхрийн агуулгатай 10 ррн ба түүнээс бага)
— 2025 оны 4-р сарын 21-ний өдөр НТГ-тай ухалма тодруулахад, Евро 2 (хүхрийн агуулгатай 1300 ррн) шатахууныг
Евро 3 автобуснад хэрэглэх байсан.

- 2023 оны 6 сарын XXV-ийн эхтэйгээр дараа ЗТН-3-ын автобусыг Ерөнхийлөгчийн ашигтай боогсон хэргийн парк шинжлэлтийн үндсэн автобусыг Хятадын Алтай Луу XXIV-а уламжранд гэмтэл гарсныг тодруулахаа урьтгаас устгалтай болгож байв.

21 3637127

- * Евро 2-оос Евро 5 шатахуун нь өндөр үнэтэй, Евро 5 үзлийнх нь ач холбогдлыг үүрэн ойлгоогүй байна.

15) Асуудлыг шийдвэртэх санат

- Алхам 1. Төсөл дүүсэх үүргэл УУХҮЯ-тай хамтарч Евро 5 шатахууны хэрэглээг нэмэгдүүлэхэд чиглэсэн үзүүлэлт

- ТАНИНЛАХ ҮНД ДАВХЫНГАМ ХЭРНЭҮҮТЭХ, ПАШИНД МОНГОЛ ТЭЛ ҮРГЭЭЛЭХҮҮНЖ

- Ахлам 2 Монголдын 31-ээс Евро 1 болон Евро 5 гүлшний үнийн мөртү арилгах

2.3 Тогтоогийн шүүлтүүр (DPF)-ийг шилжүүлэхтэй холбоотой асуудал

(1) **Өңөөгүйн байдал**

- ЖАЙНА өөр төслийн хүрэмд 2019 оны 3 сард НТТ-г японий KOMOTEK компанийн DPF 24 кв. бүрэлт, шүүлтүүр нэмвч сүргээг 15 төнөөрөөм, бусад тоноглогчийг хамт нийлүүлсэн.
- ХЗХ-ны 5-р хурал (2021 оны 6 сар) -аар НТТ-аас DPF шилжүүлэн суурилуулах төсөв байдлыг тус дэмжлэг үзүүлэхийг үргэлжлүүлсэн.

- 2019 онд ДФГ сурвалжлагч ЗТН-1. 3-р багын нэрх хэмжээгээр Евро 5 автобус (ДФГ-тэй), дараагийн автобус (ЕУ) загвартай байгаа гол ДФГ-ийн шалгуурыг сурвалжлагч автобусууд болон

- НТТ-аас ДРФ сөрөг тухайн автобусыг өлсгөлдөд, тухайн хэмжээний зогсоолын хүчин автобусыг дэмжүүлэх бодсон

- 2022 оны 6 сард 1 автобусшил ДРГ сүүртүүлсэн бэлгэвч зохиогтой ажлаагаа хангаж, үйлдвэр хамгаалалт хэт хата

- догдлогоор түүхтэйг оны 9 сард DPF-ийг (2 тг.д. үнэ) амтлалтат нисгосон.

- υπάρχουν τις ακόλουθες πληροφορίες σχετικά με το θέμα:

- 12) **Ассурани**
 12.1. В случае смерти застрахованного лица в период действия договора страхования, Страховщик выплачивает наследникам застрахованного лица сумму, определенную в договоре страхования.

- Нүүдлийн хэргийн үүрэгт чаруулсан ДҮҮГ СУУЦРУУЛА ЧИХЭХ АЖИООГ БАГСАН Олон Евро С ажлаартай тусуу ажиллада байна

- המחבר מודה לפרופ' דוד גורן על שיתוף הפעולה והעזרה במחקר, ולפרופ' יצחק שריר על שיתוף הפעולה והעזרה במחקר, ולפרופ' יצחק שריר על שיתוף הפעולה והעזרה במחקר.

- Одоголжин Есрө 5 автобусны тосгонолор (торгогчид) -ийг бүтүргэж (үр ашиг) хамгаалж байна. мань ДРГ-ийн хэрэгтэй эх

2.4 Холбогдох байгууллагын тогтвортой байдлын асуудал

Шалгуур үзүүлэлт 6-2: Агаарын бохирдлыг бууруулах арга хэмжээний санхүүжилтийг хувиарлах газар, хэлтэс нь төслөөс боловсруулсан техникийн үнэлгээний гарын авлагыг ашиглан агаарын бохирдлыг бууруулах арга хэмжээ, технологийн тохиромжтой 3-аас доошгүй ажлын санхүүжилтийг хувиарлах.

(!) Өнөөгийн байдал

- 2023 оны 11 сард ОБУХ-ны ажлын албыг татаж буулгах шийдвэр гарсан. Цаашид агаарын бохирдлыг бууруулахад зориулсан ХЭ-ний сайдын багцыг БОАЖ-ын сайдын багцад шилжүүлж, бууруулах арга хэмжээг Нийслэл хариуцахар бэлтсн. Хэлбэгдэх гэдгээрх шийдвэрүүд хараанх гаргажүй байна.

- Наангил ХТ-ын байгууллага байхгүй болсон тул дээрх үйл ажиллагаа зогсож, нэлгээр 6-7-ыг хангах боломжгүй болж байна.

(2) Саяат

- Байгууллагыг агаарын бохирдлыг бууруулах чиглэлээр тасралтгүй үйл ажиллагаа явуулах бодомжтой байлгахыг хүсь байна

1926

The diagram illustrates the four steps of the scientific method in a circular flow:

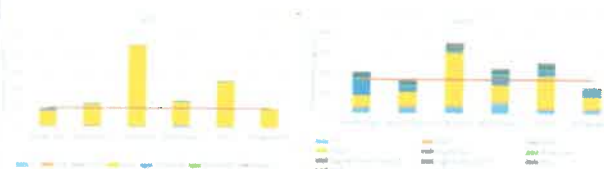
- Step 1: Ask a question** (top oval)
- Step 2: Do background research** (right oval)
- Step 3: Construct a hypothesis** (bottom oval)
- Step 4: Test the hypothesis** (left oval)

Arrows connect the steps in a clockwise cycle, indicating a continuous process.

1. Содержание

ХЗХ-ны 10 дугаар хурлаар магадлах асуудал

2020 оны өөтийн үйлдлийн агаар орчны агууламжийн тархалтын загварчлалын дүн



PMF₂. Төснийг 2-р үед нэрэг митридийн фазыг (PMF) эхэлтийн дунд гучууртан хөгжсөн агаарын тоосонцрыг загварчлалээр тусгах болно.

PM_{2.5} Төстийн 2-р үеэ зөрлөх мэргэжлийн фактор (PMF) анализыг дүнж түгшүүлэн конвейерийнхээс тоосонцрыг мэргэжлийнээр тооцогдсон

[illegible]

- Монгол тал нь загвар төслийн үр дүнд тулгуурлан ирэхийн бодит арга хэмжээ болж хэрэгжүүлэн тохиолдолд ялгарлыг хэдэн %-аар бууруулах боломжийг тооцоож, зариллын тоон шатгуурыг шийтгэж.
- Ялгарлын бууралтын суурь түвшин /онг-и БАУ хувьд/ (2030 оноор) эхэлж сайжруулсан түвшиний хэргийн дүрэн шийтгэсэн 2020 оноор тогтоох талаар дараагийн ХЭХ-ны хүртлэр хэлэлцэхээр төлөхөд байна.

Агаарын бохирдлын бүтээхэд үр дүнтэй арга хэмжээнийг хэрэгжүүлж, НАБТГ-ийн төрийн бэлэн хийсгэлэний чөлөөтөд байгууллагын хамтын ажиллагааны төгөцлөөр сайжруулахад голлох зорилготой УБ мөчийн агаарын бохирдлын бүтээхэд арга хэмжээн хэрэгжүүлж чалаач сайраарц.

[illegible]

Анхаарал тавьсанд баярлалаа



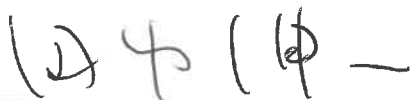
10

MINUTES OF MEETING OF
THE ELEVENTH JOINT COORDINATING COMMITTEE MEETING
ON JAPANESE TECHNICAL COOPERATION FOR
CAPACITY DEVELOPMENT PROJECT FOR AIR POLLUTION CONTROL IN
ULAANBAATAR CITY PHASE 3 in MONGOLIA

The Japan International Cooperation Agency (hereinafter referred to as “JICA”) Supervisory Team for “Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3 in Mongolia (hereinafter referred to as “the Project”), JICA Mongolia Office, and JICA Expert Team (hereinafter referred to as “JET”) had a series of meetings with the Department of Against Air and Environmental Pollution of Capital City (hereinafter referred to as “DAAEP”), the Ministry of Environment and Tourism (hereinafter referred to as “MET”) and Joint Coordinating Committee (hereinafter referred to as “JCC”) members from 7th May to 16th May 2024 to discuss the Project Completion Report, and the eleventh JCC meeting of the Project was chaired by Ms. Nominchimeg ODSUREN, Deputy Governor of Capital City in Charge of Social Sector, Green Development and Air and Environmental Pollution, on 16th May 2024. Participant list of the eleventh JCC meeting is shown in Annex I.

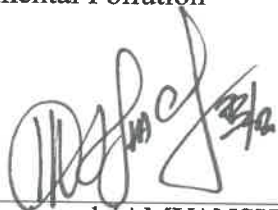
As a result of discussions, both sides agreed on matters referred to the document attached hereto.

Ulaanbaatar, 16th May 2024


Mr. Shinichi TANAKA
Chief Representative
JICA Mongolia Office
Japan International Cooperation
Agency, Japan


Ms. Nominchimeg ODSUREN
Deputy Governor of Capital City
in Charge of Social Sector, Green
Development and Air and
Environmental Pollution


Mr. Toru TABATA
Leader, JICA Expert Team, Japan


Mr. Delgerjargal JAMYANSHARAV
Director General
Department of Development
Financing and Public Investment
Ministry of Finance, Mongolia

ATTACHED DOCUMENT

I. Submission of the Draft Project Completion Report

JET submitted the Draft Project Completion Report to the Mongolian side, and requested each member's feedback and comments on the latest written form **by 24th May, 2024**, so that the comments will be reflected the Project Completion Report accordingly. The Mongolian side officially accepted the Draft Project Completion Report.

II. The Project Design Matrix

The Japanese side proposed the amendment of the Project Design Matrix (hereinafter referred to as PDM) to Mongolian side, and both sides approved on the amendment of the PDM. The approved amendment is as follows. (The revised PDM is attached as Annex III.)

1. PDM

Before (Ver.1.8)	Amended (Ver.1.9)
Objectively Verifiable Indicator 1 of the Overall Goal	
<u>XX%</u> of emissions from <u>major pollution sources</u> is reduced compared with the BAU baseline.	65% in SO _x and 43 % in PM ₁₀ emissions from <u>small stoves for household and automobiles</u> are reduced compared with the BAU baseline.
Objectively Verifiable Indicator 2 of the Overall Goal	
(newly added)	<u>The results of the Project are reflected in the policy and strategy, such as the next NPREP (National Program on Reducing Environment Pollution) and related laws and regulations.</u>
Mean of Verification 2 of the Overall Goal	
(newly added)	<u>The next NPREP (National Program on Reducing Environment Pollution) and its related documents</u>
Mean of Verification 3 of the Overall Goal	
(newly added)	<u>Interview survey to the relevant agencies</u>

III. Comments from the Mongolian side of the issues on the after the Project

Mr. Barkhasragchaa BALDORJ, Head of Environmental monitoring laboratory of Central Laboratory of Environment and Metrology asked what kind of system was desirable and which organization should take the lead in planning air pollution control measure, since it seemed Mongolia lacked such framework for policy planning, and responsible organization was not clear.

Mr. Toru TABATA, Leader of JET, explained Japanese system for making policies based on the Basic Environmental Plan and the roles of related ministries and local governments.

IV. Comments from the Japanese side of the issues on the after the Project

Ms. Watarai, Project Formulation Adviser of JICA Mongolia Office, mentioned the following points;

1. The Mongolian side is expected to continue the activities which have done in the Project, and to expand them to a full-scale project, since the Project will be completed in July.

2. Some issues in proceeding the necessary process to implement a full-scale project have been pointed out. Regarding the financial issue, for example, the Mongolian side will try to secure the budget by utilizing the Project outputs.

3. The Mongolian side and JET will keep communicating to examine some possibilities to reduce the cost until the end of the Project.

4. Although the government is responsible to develop the legal system in Japan, there are some cases that local governments take the initiatives to implement the measures ahead of the national government. I hope that everyone will try to find the best way to realize the Project effect as early as possible.

At the end of the meeting, Ms. Nominchimeg ODSUREN, Deputy Governor of Capital City in Charge of Social Sector, Green Development and Air and Environmental Pollution, mentioned that the responsibility of the Mongolian side for future air pollution control measures, including keeping up project outputs, is to consider the priority of the measures and the activities to implement in the full-scale project.

END

ANNEX I Participants of eleventh Joint Coordination Committee

ANNEX II Presentation of Project Summary and Important Issue

ANNEX III PDM (Ver.1.9)

ANNEX I Participants of Tenth Joint Coordination Committee

	Name	Organization	Position
1	Ms. Nominchimeg ODSUREN	Ulaanbaatar City	Deputy Governor of Capital City in Charge of Social Sector, Green Development and Air and Environmental Pollution
2	Mr. Enkhmunkh G.	Ministry of Environment and Tourism, Environmental Policy Coordination Department	Head of Department
3	Ms. Mongolmaa D.	Ministry of Mining and Heavy Industry, Fuel Policy Department	Head of Department
4	Ms. Gerelmaa	Ministry of Finance, Department of Development Financing and Public Investment	Adviser
5	Mr. Javzansuren D.	Ministry of Energy, Department of Fuel Policy Implementation and Coordination	Expert
6	Mr. Gereinyam B.	Ministry of Road and Transport Development, Policy and Planning Department, Standard and Normative Division	Head of Division
7	Mr. Unurbat. D	National Agency for Meteorology and Environment Monitoring	Expert
8	Mr. Barkhasragchaa B.	Central Laboratory of Environment and Metrology	Head of Environmental monitoring laboratory
9	Mr. Ulzii E.	Public Transport Department of the Capital City	Expert
10	Mr. Khuvizaya Ch.	Traffic Control Center of the Capital City	Director
11	Mr. Namuu N.	Traffic Control Center of the Capital City, Traffic Control Division	Head of Division
12	Mr. Batshagai B.	Department of Against Air and Environmental Pollution of the Capital City	Director
13	Mr. Adiyaochir	Department of Against Air and Environmental Pollution of the Capital City, Air Quality Measurement and Operation Division	Expert
14	Mr. Shinichi TANAKA	JICA Mongolia Office	Chief Representative
15	Ms. Hiroka WATARAI	JICA Mongolia Office	Project Formulation Adviser
16	Ms. Oyuntsetseg.CH	JICA Mongolia Office	National Staff
17	Mr. Toru TABATA	JICA Expert Team	Leader
18	Mr. Natsuji SAWAKI	JICA Expert Team	Vice Leader
19	Mr. Atsushi SATO	JICA Expert Team	Group Leader of Auto-mobile Countermeasure

Монгол улс Улаанбаатар хотын Агаарын бохирдлын
хяналтын чадавхыг бэхжүүлэх төсөл (3 дугаар үе шат)
Төслийн тойм

2024 оны 05 дугаар сар 16
ЛСА төслийн баг

- Агаарын бохирдлыг бууруулах үр дүнтэй арга хэмжээний хэрэгжилт, НАОБТГ, төрийн болон нийслэлийн холбогдох байгууллагын хамтын ажиллагааны тогтолцоог сайжруулахад голлон анхаарч, УБ хотын агаарын бохирдлыг бууруулах арга хэмжээг хэрэгжүүлэх чадавхыг сайжруулах

ХЗХ-ны хаалтын хурлын зорилго

- 1. Төслийн тойм
- 1.1 Төслийн тойм
- 1.2 Эрхэм зорилгын шалгуур үзүүлэлт
- 2. Төсөл дууссанаас хойших асуудал

[illegible]

1.1 Төслийн тойм	
Төсөл 1-3-р үе шатны ү/а-ны агуулга	
Үе шат-1	➢ ХЭМН-2013О(3 тэм) ➢ Төслийн хэлтэс нийт хэмжээ, хуруурцаж байгуулах НАНА (хэлтэсийн НАЛОУТ) зэрэг 19 байгууллага ➢ Төсөл 1-д сэтгүүлчид хэвлэл мэдээллийн хэрэгсэл ➢ Гутамч ба гутамчийн нөөцлөлтөөс УХЗ-ын бүтэц, хэмжээний тооцоог, ДТС-ын үнэмлэхүй хэмжээг, Агуу зорилгыг танилцуулж ажлаахуйг хийхэд байгууллагад гал нээ
Үе шат-2	➢ ХЭМН-2013О(3 тэм) ➢ Төслийн хэлтэс үнэмлэхүй хуруурцаж байгуулах НАНА (хэлтэсийн НАЛОУТ) зэрэг 19 байгууллага ➢ Төсөл 2-д сэтгүүлчид хуруурцаж байгуулах ➢ Гутамч ба гутамчийн нөөцлөлтөөс Агуу зорилгыг танилцуулж, Төслийн 1-д сэтгүүлчид хуруурцаж байгуулах НАНА (хэлтэсийн НАЛОУТ) зэрэг 19 байгууллага
Үе шат-3	➢ ХЭМН-2013О(3 тэм) ➢ Төслийн хэлтэс үнэмлэхүй хуруурцаж байгуулах НАЛОУТ зэрэг 14 байгууллага ➢ Гутамч ба гутамчийн нөөцлөлтөөс сэтгүүлчид хуруурцаж байгуулах ➢ Гал нээх үнэмлэхүй хуруурцаж байгуулах, төсөл төсөлч байгууллага бүтэц, хэмжээний тооцоог, Агуу зорилгыг танилцуулж байгууллагад гал нээх үнэмлэхүй хуруурцаж байгуулах

Агаар орчны хяналтын цикл

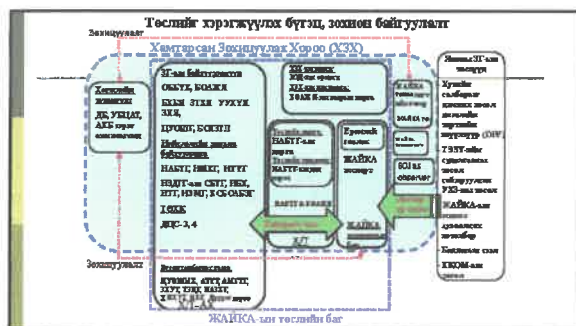
Үр дүн-1
АО, эх үүсвэрийн
анализ,
хөгжилтийн үр
түнийн үнэлгээ

Үр дүн-2
АБ-ын стратегийн,
чиглэл, шийдвэр

Үр дүн-3
АБ-ын арга
хэмжээний үнэлэлт

Үр дүн-4
АБ-ын арга
хэмжээний
хөгжүүлэлт

Үр дүн-5
АБ-ын арга
хэмжээний
хөгжүүлэлт



- (1) Ахуйн хэрэгтээний сайжруулсан шахмил түлш
- (2) Гэрлэн дохноны асалтын горимын өөрчлөлт
- (3) Автотээврийн хэрэгслийн хүсэр багатай шатахуун болон ялгарал багатай тээврийн хэрэгслийн хэрэгтээг нэмэгдүүлэх
- (4) Эко жолоодлогыг нэвтрүүлэх
- (5) Remote Sensing Device (RSD) ашиглан авто зам дээрх хаягдал утааны судалгаа
- (6) Дизель хөдөлгүүртэй тээврийн хэрэгслийн РМ-ыг бууруулах тоногдол (Diesel Particulate Filter: DPF гэх мэт)

[illegible]Бүтээгдэхүүн
буцаахуур[illegible]

Шаталтын үеийн хягдал хийний агууламж,
температурын өөрчлөлт(Raw Data)

Төрөл	Сайжруулсан зүүх	Уламжлалт зүүх
DUST	Ялгарлын стандартыг хангасан	Ялгарлын стандартыг хангасан ч сайжруулсан DUST-ээс 50% багттай
CO	Ялгарлын стандартыг хангасан	Ялгарлын стандартыг хангаагүй, өндөр агуулгатай CO-г бууруулах үзэгдэж байсан
Шаталтын	Дундажаар 243°C	Дундажаар 208°C

(4) Эко жолоодлогыг нэвтрүүлэх

<Үйл ажиллагаа>

- ЖАЙКА-тай төстөр ЗТХЯ-а эко жолоодлогыг дэмжих 20 тн өөрөөснийг нэвтрүүлж, суурьшуулсан автомашинуудыг нэгж эко жолоодлогын бэлтгэлд оруулж, эко жолоодлогын дэвхэ суурьшвар хийгээд байна.
- Эсгийг жолоодогчид болон эко жолоодлогыг үнэмлэхүйгээр АСХУХ-аас хийж, хэргийг хийхэд хэмжээг хэргийг, УБ-аас эко жолоодлогыг зоригжуулсан өгчөөр болон хуульчилсан хийгээд бууруулж үр жолоог бэлтгэж байгаа.
- Эко жолоодлогыг өгчөөр болон хуульчилсан хийгээд бууруулж эко жолоодлогыг олон хийгээд суурьшвар байна.



Эко жолоодлогын зоригжуулсан төхөөрөмж

(6) Дизель хөдөлгүүртэй тээврийн хэрэгсэлийн РМ-ыг бууруулах тоноглол (Diesel Particulate Filter :DPF)

<Үйл ажиллагаа>

- РМ бууруулах төхөөрөмж(DPF) зориулсан ашиглалтын хяналтын системийг байгуулах.
- "Монгол Улсад дизель хөдөлгүүртэй тээврийн хэрэгсэлд DPF ашиглах тоноглолыг бууруулах төхөөрөмж байгуулахад төсөл"-ийн хүрээнд DPF тоноглолыг ашигласныг гаргах. Ойролх тээврийн хэрэгсэлд суурьшуулсан DPF-ийг ашигласныг суурьшуулж ашигласныг HTT-аас гаргах, 2 ашигласныг DPF-ийг ашигласныг суурьшуулж байна.



DPF/Дизельн хөдөлгүүр суурьшуулсан байдал

(5) Remote Sensing Device(RSD) ашиглан авто зам дээрх хаягдал утааны судалгаа

<Үйл ажиллагаа>

- НАОБТГ, АТУТ, ТЦГ-тай хамтран УБ хотын авто замын төлбөр авах цэгүүдэд утааны хийн хэмжээг судалгааг RSD ашиглан хийж, RSD болон тогтоогчийг хэмжээг утгаас утга нхтэй тээврийн хэрэгсэлийг журмыг RSD-ийн утга ашигласныг стандарт утгыг тодорхойлсон.
- Авто замын хяналт үйлдэг зориулсан ажлын журам, судалгааны бүрэлдэхүүн, шалгалтын ажлааг өргө өргө зохнон байгуулах техниксийн удирдамжыг боловсруулсан.

4. Агаарын бохирдлыг бууруулах чиглэлээр олон нийтэд мэдээлэх үйл ажиллагаа (Монгол, Япон)



АНСХ-ын талаар Монголын төлөөллийн сурталчлага



Япон ТБС-ын нэвтрүүлэг (2024/02/14)



Хүхэр багатай шатаахуйн нэвтрүүлэг талаар ТБС-ын нэвтрүүлэг



Хүхэр багатай шатаахуйн нэвтрүүлэг тухай телевизийн сурталчлага (2024/04/23)

RSD-ын стандарт утгыг ашиглан авто зам дээрх хяналтын журмыг нэвтрүүлэх зорилготой журмын агуулга, торгууль, албан шаардлага зоригийг судалж, захирамж болон шаардлагатай хууль тогтоомжийг ЗТХЯ-тай хамтран судалсан. ЗТХЯ, HTT нь RSD-ыг худалдан авах, авто замын хяналтын хяналтыг хэрэглэх тогтоогчийг бий болгох шаардлагатай байна.



5. Төслийн зорилтын үр дүнгийн биелэлтийн явц

Төслийн зорилтын биелэлт	2024 оны 6-р сарын байдал
Шалгуур 1. Загвар төсвийн нэг хэсэг болон эргэ хэлбэр болон нэвтрүүлсэн төсвийн байдал.	Шалгуур 1-ийн үр дүн: Төсвийн 2024 оны 6-р сарын байдал. Төсвийн 2024 оны 6-р сарын байдал. Төсвийн 2024 оны 6-р сарын байдал.
Шалгуур 2. Загвар төсвийн эргэ хэлбэр нь өндөр түрүүлж байгааг нотлох, өндөр (100%) т хийгээд байна.	Шалгуур 2-ийн үр дүн: Төсвийн 2024 оны 6-р сарын байдал. Төсвийн 2024 оны 6-р сарын байдал. Төсвийн 2024 оны 6-р сарын байдал.
Шалгуур 3. 75 жилийн өмнөх цахилгаан бүтээгдэхүүн өндөр түрүүлж байгааг нотлох, өндөр (100%) т хийгээд байна.	Шалгуур 3-ийн үр дүн: Төсвийн 2024 оны 6-р сарын байдал. Төсвийн 2024 оны 6-р сарын байдал. Төсвийн 2024 оны 6-р сарын байдал.

Дүгнэлт

- [illegible]

Анхаарал хандуулсанд баярлалаа



6. Дүгнэлт

- [illegible]

Эрхэм зорилгын шалгуурыг тодорхойлох тухай

2024/5/16
Мэргэжилтний баг

1. Зорилго

1. Тус төслийн эрхэм зорилго болон шалгуур үзүүлэлт нь:

Эрхэм зорилго: Улаанбаатар хотын агаарын чанарыг сайжруулж, голлж эх үүсвэрүүдээс ялгарах боксирдуулах бодисын ялгарал бууруу.

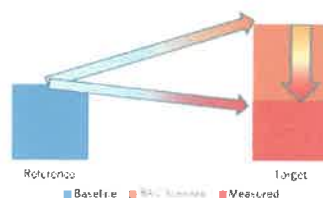
Шалгуур үзүүлэлт: Голлох эх үүсвэрүүдээс ялгарах боксирдуулах бодисын ялгарал BAU хувилбар (бууруулах төсөл, арга хэмжээ хэрэгжээгүй) -тай харьцуулахад XX%-иар буурах.

2. Эрхэм зорилгын шалгуурт боксирдуулах бодисын ялгарлыг бууруулах тоо хэмжээг тодорхойлохдоо BAU хувилбарын ялгарал болон загвар төслийн цаашид бодит арга хэмжээ болгож хэрэгжүүлсэн тохиолдлын ялгарлыг тус тус тооцоолсны үндсэн дээр бууруулах ялгарлын тоо хэмжээг тогтооно.

2.1. Суурь түвшин (он) болон ирээдүйн зорилтот оныг тодорхойлох

1. Суурь оныг сайжруулсан шахмал түвшний хэрэглээнд бүрэн шилжсэн 2020 оноор тогтоосон.
2. Ирээдүйн оныг Төсөл төлөвлөлтийн матрицд заасан эрхэм зорилгыг хангах үе буюу төсөл дууссанаас хойш 3 жилийн дараа 2027 оноор тогтоосон.
3. 2027 онд загвар төсөл хэрэгжээгүй байх тохиолдол буюу ямар ч арга хэмжээ хэрэгжүүлээгүй байх (Business as Usual /BAU/) хувилбарыг эх үүсвэрүүдийн ялгарлыг тооцсон.
4. Загвар төслийн үр дүнд тулгуурлан 2027 онд бодит арга хэмжээ болж хэрэгжсэн тохиолдолд ялгарлыг бууруулах үр дүнг тооцсон.
5. BAU хувилбарын ялгарал болон бууруулах арга хэмжээ хэрэгжүүлсэний дараах ялгарлын зөрүүгээс ялгарлын хэмжээний бууралт, хувийг тооцоолсон.

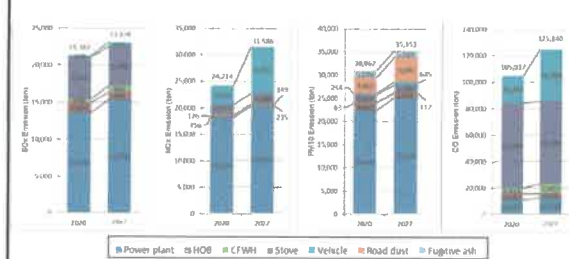
2.2. BAU хувилбар ба арга хэмжээний хувилбар



2.3. BAU хувилбарын тохиргоо

Эх үүсвэр	Орхотгох хувийн өөрчлөх үзүүлэлт	Сүүлийн жил	Ирээдүйн жил	Өөрчлөх хувийн өөрчлөх
BAU	2015-2020 оны түвшний хэмжээний өөрчлөх хувийн	2020	2027	0.6-5.8%
BAU	2016-2020 оны түвшний хэмжээний өөрчлөх хувийн			-5.8%
BAU	2015-2020 оны түвшний хэмжээний өөрчлөх хувийн			8.3%
Агаарын чанарын өөрчлөх	2015-2020 оны гэр хорооллын хүн амын өөрчлөх хувийн (дүүрэг тус бүрээр)			Гэр -2.7% Байшин 0.4%
Тухайн үеийн агаарын чанарын өөрчлөх	2019-2022 оны ажиглалтын үзэм, өнцөгтөөс тухайн ТХ-ийн тооны өөрчлөх хувийн			Оуушны 6.4% Алтбус 8.8% Ажлын машин 3.7%

2.4. Ирээдүйн BAU хувилбарын ялгарал



3.1. Сонгосон загвар төсөл

1. Дараах загвар төслийг туршилтгаар хэрэгжүүлсэн.
 1. Сайжруулсан шахмал түлш (Биомассын хольцтой шахмал /BCB/)
 2. Гэрлэн дохионы зохицуулалт
 3. Хүхэр багатай шатахуун, ялгарал багатай ТХ (бүх ТХ, зөвхөн автобус)
 4. Эко жолоодлого
 5. Тортогийн шүүлтүүр /DPF/(зөвхөн автобус)
 6. Хаягдал утааны зайнаас хэмжигч /RSD/
2. Эдгээрээс төслийн баг нь цаашид монголд 2027 он хүртэл бодит арга хэмжээ болж хэрэгжих магадлалтай төсөл нь биомассын хольцтой шахмал түлш (BCB), хүхэр багатай шатахуун, ялгарал багатай ТХ (зөвхөн автобус), RSD гэж үзэж, эрхэм зорилгын шалгуурт тус 3 төслийн ялгарлын бууралтын хувийг үнэлсэн.

3.2 Загвар төслийн үр дүнд тулгуурлан ялгарлын бууралтыг тооцох нөхцөл (1)

Алгуур	Хэрэгжүүлсэн загвар					
Сайжруулсан уух (BCB)	Гэрийн зуухны ялгарлыг бууруулах арга хэмжээний ТТТ-ийг сайжруулсан шахмал түлшний оролд тус тусын савил болгох биомассын хольцтой шахмал түлш (BCB) ний хэрэглээнд шилжих төлөвлөгөө.					
	Бүх төрлийн гэрийн зууханд BCB хэрэглэх нөхцөл үүсэх, зуухны ажлын орчинг шалгалтын туршилтаар тодорхойлсон ялгарлын коэффициентийг үндэс утгад шилгэсэн.					
	SO _x нь түлшний өгүүлэгдэх хурдтай пропорциональ хэмжээнд тун түлшний утгааны хийн шалгалтын туршилтаар хэмжигч бага утгад SO _x -ийг JK 6 бичих ашигласан.					
	Түлшний зарцуулалтыг ТТТ-ийг сайжруулсан шахмал түлшний зарцуулалтын хэмжээтэй харьцуулж үнэлсэн.					
Түлш	Гэрийн зуухны төрөл	SO _x	NO _x	PM ₁₀	PM _{2.5}	CO
Сайжруулсан уух	Уламжлалт уух (2022 оны хэмжээ)	11.88	4.79	2.82	2.53	153.23
Сайжруулсан уух	Сайжруулсан уух (2020 оны хэмжээ)	12.02	3.04	1.77	1.59	106.51
BCB	Уламжлалт уух	3.51	2.92	1.41	1.27	145.00
	Сайжруулсан уух	3.51	2.09	0.94	0.85	29.54

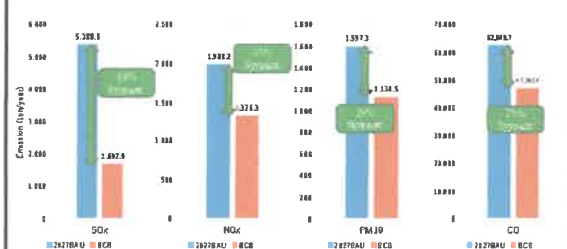
Нэм: голын тухай

Нэгж: г/тунх түлш

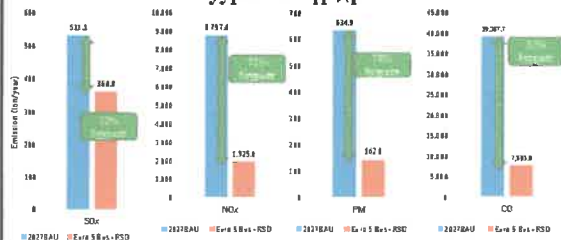
3.2 Загвар төслийн үр дүнд тулгуурлан ялгарлын бууралтыг тооцох нөхцөл (2)

Алгуур загвар	Хэрэгжүүлсэн загвар
Одот уух, ялгарал багатай ТХ (зөвхөн автобус)	Евро IV-ээс хүртээх бүх автобус Евро V стандартын автобусаар шилжүүлж, мөн Евро 5 стандартын түлш хэрэглэнэ. (Сүүр ирэхэй түлшээс үүсэхэй ялгарлын хэмжээг бууруулах аргаар) Бүх автобусанд жилд 2005 оны ялгарлын стандартыг коэффициенттэй ашиглана. Хүхэр багатай 10 ppm гэж үзэх.
ТХ-ийн утааны зайнаас хэмжигч RSD	RSD ашигласан ялгарал утааны хэмжигчээр ялгарлын стандартыг хэтрэн ТХ-ийг жуурилах, УБ хийн ангилалыг худалдвал оролцуулжгүй байх, ТХ-ийн төлөвийн тасархай, ямар үйлчилгээг төгсөм хийснээр ТХ-ийн дотоодыг багасгах тооцол. Ялгарлын стандартыг ялгарал утааны торлогонд 40%-иас хэтрэн (жишээ 1998 оны ялгарлын стандартыг өмнө) ТХ-ийг өндөрт оролцуулж болох. Төмөрний бүрэн бүтэц хэрэглэхгүй.

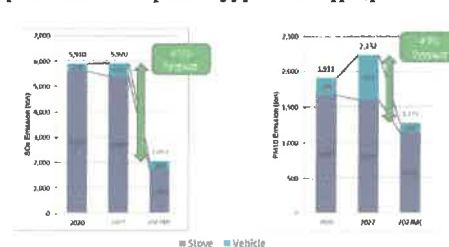
3.3 Биомассын хольцтой шахмал түлшний загвар төсөл: Гэрийн зуухны ялгарлын бууралтын үр дүн



3.4 ТХ-ийн загвар төслийн хаягдал утааны ялгарлын бууралтын үр дүн



3.5 Биомассын хольцтой шахмал түлш болон ТХ-ийн загвар төслийн ялгарлын бууралтын үр дүн



4. Дүгнэлт

1. 2027 он хүртэл бодит арга хэмжээ болж хэрэгжих магадлалтай загвар төслийн ялгарлын бууралтын үр дүнг баримжаалж тооцоолсон.
2. Биомассын хольцтой шахмал түлшний загвар төслөөр гэрийн зуухны ялгарал SOx 69%-иар, PM₁₀ 29%-иар буурна гэж тооцоолсон.
3. ТХ-ийн загвар төслөөр хягдал утааны ялгарал SOx 32%, PM₁₀ 78%-иар буурна гэж тооцсон.
4. Загвар төслийг хэрэгжүүлсэнээр ахуйн хэрэглээний зуух болон ТХ-ийн ялгарал SOx 65%, PM₁₀ 43%-иар буурна гэж тооцсон.

5. Эрхэм зорилгын тоон шалгуурыг тодорхойлох санал

1. Загвар төслийн үр дүнд тулгуурласан арга хэмжээний саналын ялгарлын бууралтын үр дүнгээс эрхэм зорилгыг хангах тоон шалгуурыг дараах байдлаар тодорхойлох санал гаргаж байна.

Ахуйн хэрэглээний зуух болон тээврийн хэрэгслийн бохирдуулах бодисын ялгарлын хэмжээ нь BAU хувилбартай харьцуулахад SOx 65%, PM₁₀ 43% буурах.

Эрхэм зорилгод “Шалгуур 2”-ыг нэмэх тухай

2024/5/16
Мэргэжилтний баг

1. Эрхэм зорилгын шалгуурыг нэмэх санал

ЖАЙКА байгууллага нь тус төсөл дуусвал 3 жилийн дараа (2027 он) экс-пост үнэлгээ хийнэ. Тус үнэлгээ нь төслийн зорилго, үр дүнгийн тогтвортой байдал, үйл ажиллагааны нөхцөл байдлыг баталгаажуулж, эрхэм зорилгын биелэлтийн байдлыг магадладаг.

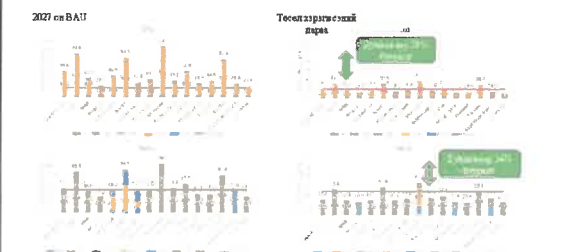
Төсөл дууссаны дараах монгол талын агаарын бохирдлыг бууруулах арга хэмжээний хэрэгжлэлийг зохицотой үнэлэхийн тулд шалгуур (Шалгуур 2)-ыг нэмэх санал гаргаж байна.

Эрхэм зорилго : Улаанбаатар хотын шаарын чанарыг сайжруулж, голцек их үүсвэрүүдээс ялгарал бохирдуулах бодисын ялгарал буурна.

Шалгуур 1: Ахуйн хэрэглээний зуух болон тээврийн хэрэгслийн бохирдуулах бодисын ялгарлын хэмжээ нь BAU хувилбартай харьцуулахад SOx 65%, PM₁₀ 43% буурах.

Шалгуур 2: Төслийн үр дүнд нь “Агаар, орчны бохирдлыг бууруулах үндэсний хөтөлбөр” зэрэг төрөөс баримтлах бодлого, стратегийн болов хөгжлөх хууль, журамд тусгагдах.
(Жишээ 1) Загвар төсөл нь Үндэсний хөтөлбөрт сонгогдон орж, бодит арга хэмжээ болж хэрэгжих.
(Жишээ 2) Сайжруулсан шахмал түлшний утааны хийн хэмжээний аргачлал нь стандарт (MNS) болж биелдэх.

(Reference) Биомассын хольцтой шахмал түлш болон ТХ-ийн загвар төслийн агууламжийн бууралтын үр дүн



Монгол улс Улаанбаатар хотын агаарын
бохирдлын хяналтын чадавхыг бэхжүүлэх төсөл
(3 дугаар үе шат)
ХЗХ-ны хаалтын хурал

2024 оны 5-р сарын 16
ЖАЙКА төслийн баг

1

1. Төслөөс хойших агаарын бохирдлыг бууруулах арга хэмжээ

- 2010 оноос эхэлж, 1, 2, 3-р үе шат хүртэл хэрэгжсэн тус төсөл нь 2024 оны 7 сард дуусна.
- Цаашид агаарын бохирдлыг бууруулах арга хэмжээг оновчтой сонгож, хэрэгжилтийг эрчимжүүлэх шаардлагатай байна.

4

ХЗХ-ны хаалтын хурлын зорилго

1. Төслийн тойм
 - 1.1 Төслийн тойм
 - 1.2 Эрхэм зорилгын шалгуур үзүүлэлт
2. Төсөл дууссанаас хойших асуудал

2

1. Төслөөс хойших агаарын бохирдлыг бууруулах арга хэмжээ (2)



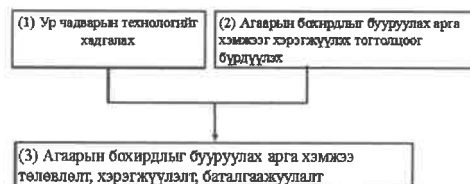
Агаар орчны хяналтын циспым дагуу циспым дагуу ажлаагаагид оруулах гэж нийдаж байна.

2. Төсөл дууссанаас хойших
асуудал

3

1. Төслөөс хойших агаарын бохирдлыг бууруулах арга хэмжээ (3)

Агаарын бохирдлыг бууруулах арга хэмжээг цаашид хэрэгжүүлэх 3 гол чиглэл



6

7

18

Улсын төсөв, хандивлагчдын хөрөнгө оруулалт, санхүүжилтийн дэмжлэг

9

9

- Нийт эрхэм хүний үйлдвэрлэл, халуун усны хангамжийг нэмэгдүүлэх арга хэмжээ
- Одоо ажиллаж байгаа дулааны цахилгаан станцуудад агаарын бохирдлын эсрэг авах арга хэмжээг сайжруулах
- Дулааны цахилгаан станц шинээр барихдаа агаарын бохирдлоос урьдчилан сэргийлэх арга хэмжээг сайтар хөнд
- Эрхэм хүний сүлжээг босгохуулж, дамжуулах, гүтгэх үр ашгийг дээшлүүлэх

2) УХЗ-ын арга хэмжээ

- УХЗ-ыг халж, төвлөрсөн хангамжид холбох
- Цилион, скруббер суурилуулах
- Шинээр том хэмээсийн дулаан хангамжийн байгууламж барьж, УХЗ-ыг татан буулгах

Метро, монокэйл, BRT зэрэг шинэ үеийн тээврийн системийг нэвтрүүлэх

- 1) Ахуйн хэрэгслэний сайжруулсан шахмал түлш
 - НАОБТ-ын зуухны лабораторид нэг түлшинд багцая 3-аас дээш удаа утааны хийн шаталтын туршилт хийж, чанарыг үнэмлэх баталгатай тоон өгөгдлийг цуглуулах
 - PM, SO₂ ялгарлын коэффициент багцтайг сонгох
 - Асалт, шаталтийг холбоотой дутагдлагийг талыг тодорхойлох
- 2) Ахуйн хэрэгслэний зуух
 - Утаарын хийн (CO) эрсдэлтийг, MNSS216:2016 стандарт хангаггүй уламжлалт зуулыг худалдан борлуулал, ялгавчлахыг хөргөх

- 2027 онд эрхэм зорилгыг хангахад чиглэсэн арга хэмжээний хувьд биомассын хольцтой шахмал түлш, хүхэр багатай шатахуун, ялгарал багатай автомашин, RSD-ийг ашигласан авто замын хяналт зэрэг загвар төслүүдийг эрэмбэлэн жагсаалаа. Шаалд Монгол талаас бодлогын арга хэмжээ бошгон өргөжүүлэн хэрэгжүүлэх шавардлагатай.
- Эдгээр загвар төслийг бодлогын арга хэмжээ болгоход Монгол талаас хэрэгжүүлэх шавардлагатай үйл ажиллагаанууд.

- 3) Ахуйн хэрэгтэнд орлох гүйшгийг нэвтрүүлэх
 - Евомасын хольцтой шахмал гүйшгийг нэвтрүүлэх
 - Хотын хийг дамжуулах
 - УБ хотын хийг дамжуулах шугам хөдөл, хийн агуулгын ажиглалтын заавар, хэрэгжигчдийг зориулсан хийн хэрэгтэнд хийн суртал
 - Цөөнх заавар шийдвэрлэх
 - Байгалийн хий болох DME нэвч гүйшгийг хэрэгтэнд шилжүүлэх

[illegible]

4. 2 Хүхэр багатай шатахуун, ялгарал багатай автомашин

	Шардлагатай төсвийн зардал	Шардлуулж буй төсвийн зардал
хүхэр багатай шатахуун, ялгарал багатай автомашин хэрэглээг нэмэгдүүлэх	* EURO V эсвэл VI автобусанд бүрэн шилжихэд шаардагдах худалдан авах зардлыг баталгаажуулах * EURO V эсвэл VI автобусанд шаардлагатай EBP0 5 шатахууны төсвийг баталгаажуулах (энгийн түлшний үнийн зөрүү)	* Евро 5 шатахууны импортын хэмжээг нэмэгдүүлэх тогтолцоог бий болгох (импортологч улсыг нэмэгдүүлэх, боловсруулах үйлдвэр барих гэж мэт) * Ялгарал багатай тээврийн хэрэгслийг нэмэгдүүлэхэд шаардлагатай хууль тогтоомж * Импортыг УУХҮЯ, дотоодын борлуулалтыг ЭХЯ

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4. 3 RSD-ыг ашигласан авто замын хяналт

	Шардлагатай төсвийн зардал	Хэрэглэж буй төсвийн зардал
RSD-ыг ашигласан авто замын хяналт	* RSD иж бүрдэл худалдан авах зардлыг төсөвт суулгах (ойролцоогоор 200,000 евро) * RSD-ын хэмжилтэд шаардлагатай стандарт хийний нийлүүлэлтийн зардал	* RSD болон опасиметрыг ашиглан утаа ихтэй т/х-ыг журамлах эрх зүйн тогтолцоог нэвтрүүлэх. * ЗТХЯ-аас RSD болон опасиметр ашигласан авто замын байнгын хяналт бий болгох

21

Анхаарал тавьсанд баярлалаа!

21

Project Design Matrix (PDM)

Ver.1.9
Dated: May 16, 2024

Project Title: Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3
Implementing Agency: Department of Against Air and Environmental Pollution (DAAEP) of Ulaanbaatar (UB) City, Ministry of Environment and Tourism (MET) and Counterpart Working Group (C/P-WG)
Target Group: DAAEP, MET, C/P-WG and Relevant Agencies
Duration of the Project: November 2018 – July 2024 (5 years and 9 months)
Project Site: UB City

Narrative Summary		Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Emission reduction at major emission sources is enhanced towards air quality improvement in Ulaanbaatar City.	65% in SO_x and 43 % in PM₁₀ emissions from small stoves for household and automobiles are reduced compared with the BAU baseline. - The results of the Project are reflected in the policy and strategy, such as the next NPREP (National Program on Reducing Environment Pollution) and related laws and regulations.			
Project Purpose Capacity for air pollution control in Ulaanbaatar City is strengthened, paying special attentions to implementation of effective pollution control measures and to the necessary coordinating mechanism of DAAEP and the relevant agencies.	- One of pilot projects are adopted as full scale implementation by relevant authorities. - At least one case of lessons learned from the pilot projects are utilized by the decision makers. - Relevant laws, regulations and standards on air pollution control measures are implemented in UB City. (At least establishment of one MNS, and/or 70% of compliance in the dust emission standards of existing MNS; MNS5043:2016 (General technical requirement of heat water boiler under 4.2MW) and MNS5919:2008 (Emission limit value and measurement method of power plant, steam boiler))			
Outputs				
Output 1: Capabilities of emission monitoring for the major pollution sources and of air quality monitoring are strengthened.	- During the Project duration, at least 50% of inspections for boiler registration based on emission measurements (including standard and simplified methodologies) are implemented by DAAEP and IACC. - The emission measurement reports are submitted to Project Leader of UB city in charge of air and environmental pollution at least 3 times during the Project duration. - Emission monitoring for the major pollution sources and air quality monitoring information are shared regularly among the relevant agencies through coordination between DAAEP and NAMEM. - The CEMS measurement is compared with the standard measurement once in a year. - Distribution of emission measurements from vehicles in UB City is prepared based on the study with RSD at least once a year.			
Output 2: Capabilities to analyze and evaluate pollution structure of PM, SO ₂ , and NO _x throughout the year are strengthened.	- The results of PM apportionment study are reported at least three times during the Project. - Pollution structures are assessed at least 3 times during the Project duration including emission inventory, simulation model, PM specification, receptor model, air quality monitoring and population exposure throughout the year.			
Output 3: Capabilities of technical evaluation and preparation of air pollution control measures for implementation are strengthened.	- Drafts of emission measurement methods and quality standards of improved fuel for households in Ger area are submitted to MAASM. - At least three of implementation plans of the pilot projects are prepared.			
			- Emission measurement reports by DAAEP / IACC - The Project reports - Boiler registration database - Air quality monitoring monthly reports and annual reports - CEMS data	- Legal and political framework for air quality management is maintained, which defines decision making mechanism such as NCEPR and professional agencies like DAAEP and NAMEM. - The COVID-19 pandemic situation will be improved and JICA will be able to send JICA Experts to Mongolia toward April 2021 until the end of the Project.
			The Project reports	
			The Project reports	

Output 4: Decision making process for air pollution control is improved by utilizing the Professional agencies including DAAEP, NAMEM and the relevant agencies.	4-1. Analysis of air pollution status, short-, medium- and long-term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned) are presented to decision makers at least 2 times. 4-2. Results of pilot project implementation and other Project results are utilized for the revision of NCEPR and for decision making on implementation/non-implementation of pollution control measures at least once.	1. The Project reports 2. Reports on NPREP
Output 5: Air pollution control measures are enhanced for PM, SO ₂ and NO _x emission reduction at major sources.	5-1. At least three pilot projects selected by C/P-WG are implemented 5-2. The results of each pilot project (emission reduction, improvement of ambient air quality and population exposure for PM, SO ₂ and NO _x) are presented to the relevant agencies.	1. The Project reports
Output 6: Legal framework, resource allocation and coordinating mechanism as a Platform for the Air Quality Management Cycle are strengthened for the Outputs 1 to 5.	6-1. At least three of drafts on laws and regulations, such as fuel regulations, MNS emission standards and ordinances of UB City, are submitted. 6-2. More than 3 air pollution control measures and technologies are funded by the sections of the relevant agencies in charge of allocating funds for air pollution control by utilizing technical appraisal guideline provided by the Project. 6-3. At least three agreements are made on demarcation of roles of the relevant agencies for air pollution control measures in the Project. 6-4. The operational guideline is distributed to relevant agencies.	1. Laws and regulations, fuel regulations, MNS emission standards and ordinances of UB City 2. Minutes of Meeting of NCEPR 3. Official documents including UB city Governor's orders 4. Operational guideline

Activities		Inputs	
1-1 1-1 DAAEP and IACC ¹⁾ reinforce HOB inspections based on on-site stack gas measurements. 1-1-1 DAAEP and JICA Experts assess the technical transfer on-site stack gas measurement. 1-1-2 DAAEP with JICA Experts re-constructs 2 teams of stack gas measurement. 1-1-3 IACC and the relevant agencies with JICA Experts implement HOB inspection based on on-site stack gas measurement. 1-1-4 IACC with JICA Experts introduces simplified measurement method by using IACC's portable gas measurement equipment including parallel measurement with JIS method, elaboration of manuals and manufacturer's calibration. ²⁾ 1-1-5 DAAEP and IACC with JICA Experts elaborate emission measurement reports. 1-1 1-2 TPP3 and TPP4 with JICA Experts enhance emission gas control by utilizing CEMS. 1-2-1 TPP3 and TPP4 with JICA Experts elaborate and implement CEMS operation and maintenance plan. 1-2-2 TPP3 and TPP4 with JICA Experts perform quality control of emission gas data of CEMS. 1-2-3 TPP3 with MET and the relevant agencies elaborates online emission data reporting system for the CEMS. 1-2-4 NAMEM and the relevant agencies share and evaluate CEMS emission data. 1-2-5 NAMEM compiles monitoring data of emissions from TPP2, TPP3, TPP4 and new large heat supply facilities and share them with relevant agencies. 1-3 MRTD and PTD introduce relevant regulations of vehicles based on emission measurement. 1-3-1 MRTD and PTD with JICA Experts implement vehicle emission measurements by RSD, assess distribution of vehicles emission intensity and define target vehicles to be regulated. 1-3-2 MRPA and IACC with JICA Experts implement automobile fuel surveys. 1-3-3 JICA Experts conduct training to NRTC, in addition to DAAEP, on vehicle emission measurement using on-board emission measurement system, and DAAEP and NRTC implement vehicle emission measurement using on-board emission measurement system. 1-3-4 Public Transportation Department of the Capital City with JICA Expert transfer the DPF which were installed on 24 large buses by the project "Verification Survey with the Private Sector for Disseminating Japanese Technologies for Emission Reduction of Particulate Matter (PM) from Diesel Buses by DPF" to other buses.	Japanese side 1. JICA Experts (necessary fields) (1) Chief Advisor (2) Air Pollution Control Planning and Policy (3) Emission Measurement for Stationary Sources (4) Ambient Air Quality Monitoring (5) Ambient Air Quality Analysis (6) PM10 and PM2.5 Sampling (7) PM10 and PM2.5 Apportionment Study (8) Emission Inventory (Stationary, Mobile and Others) (9) Air Quality Simulation Modeling / Air Pollution Control Measures Evaluation (10) Auto-mobile Emission Control 1 (Traffic Signal Control) (11) Auto-mobile Emission Control 2 (RSD and others) / Emission	Mongolian side 1. C/P and C/P-WG (1) JCC Chairperson (2) JCC Vice-Chairperson (3) Project Director (4) Project Manager (5) Necessary C/P and C/P-WG staff according to the fields of JICA Experts 2. Facility (1) Provision of necessary office space in DAAEP and MET (including internet access) (2) CLEM Laboratory Equipment (3) Storage Space for Equipment 3. Local cost (1) Counterpart expenses such as salary, allowance, travel cost and accommodation (2) Project administrative expenses	1. There are no frequent leaves, transfers or resignations of C/P and C/P-WG members. 2. Necessary coordination among UB city, districts, khoroos and communities in Ger area is secured by Mongolian side for implementation of pilot projects.

1-4 DAAEP and NAMEM with JICA Experts strengthen AQMS utilization. 1-4-1 CLEM and JICA Experts assess the current status of equipment in reference laboratory of CLEM and identify necessary actions if necessary. 1-4-2 DAAEP reinforces AQMS operation and maintenance based on the plan by Phase 2. 1-4-3 DAAEP with JICA Experts starts air quality monitoring at pilot project area for improved household fuels by utilizing mobile AQMS. 1-4-4 DAAEP with JICA Experts reinforces the AQMS at Bayankhoshuu station. 1-4-5 DAAEP and NAMEM with JICA Experts implement parallel measurement by FRM sampler for PM concentration, and implement quality control of PM measurements of AQMS. 1-4-6 DAAEP and NAMEM with JICA Experts maintain the online information system of AQMS. 1-4-7 DAAEP and NAMEM share real-time monitoring data with the relevant agencies through the online information system. 1-4-8 DAAEP and CLEM with JICA Experts analyze air quality monitoring data and elaborate air quality monitoring reports. 1-4-9 The relevant agencies utilize air quality monitoring data. 1-4-10 DAAEP with JICA Experts establishes the data transfer system of air quality monitoring data of Dambadarjaa station to the online information system of AQMS. 2-1 NAMEM and JICA Experts conduct PM apportionment study based on PM speciation throughout the year. 2-1-1 CLEM and JICA Experts elaborate PM sampling plan throughout the year, and implement PM samplings. 2-1-2 JICA Experts perform PM speciation analysis in Japan. 2-1-3 NAMEM and CLEM with JICA Experts learn PM speciation technologies (ion analysis, element analysis and carbon analysis). 2-1-4 NAMEM and CLEM with JICA Experts formulate equipment and laboratory plan for PM speciation. 2-1-5 DAAEP and NAMEM with JICA Experts perform PM apportionment study based on receptor modeling. 2-2 DAAEP and NAMEM with JICA Experts evaluate air pollution structure and health impact based on air quality simulation model and receptor model. 2-2-1 DAAEP and NAMEM elaborate plans for updating emission inventory. 2-2-2 DAAEP, TCC and PTD implement studies for mobile sources including update of emission inventory, examination of traffic signal control, traffic volume and vehicle traveling speed. 2-2-3 DAAEP and JICA Experts select the pilot areas and assess Ger stoves usage pattern (type and model of stoves, seasonal pattern of usage, insulation of Ger housing and coal consumption). 2-2-4 DAAEP and NAMEM with JICA Experts implement studies for other emission sources as necessary. 2-2-5 DAAEP and NAMEM with JICA Experts elaborates BAU (Business as usual) scenario for the future year based on TPPs future development plans, projection of number of vehicle, population, economic growth, emission regulation, fuel quality regulation and so on. 2-2-6 DAAEP and NAMEM update emission inventory for the present year and the future year for the BAU scenario. 2-2-7 DAAEP and NAMEM update the air quality simulation model for PM10, SO₂ and NO_x. 2-2-8 DAAEP and NAMEM evaluate the air pollution structure of UB city. 2-2-9 DAAEP and NAMEM evaluate indicative population exposure of PM10 based on population weighted concentration and so on. 3-1 DAAEP and the relevant agencies elaborate a draft MNS on an emission measurement method of improved fuel and fuel quality, and propose it to MASM. 3-2 JICA Experts collect information about fuel gas usage in Mongolia, elaborate safety standards for gas based on Japanese experiences, and then submit it to Ministry of Energy. 3-3 DAAEP and the relevant agencies elaborate implementation plans and terms of reference for pilot projects such as improved fuel, HOB, traffic signal control, eco-driving, RSD, smoke belching program based on portable emission device, DPF, low sulfur fuel and low emission vehicles. 4-1 DAAEP and NAMEM submit to the decision makers the analysis of air pollution status, short-, medium- and long- term air pollution control strategies (including BAU analysis) and evaluation of air pollution control measures (including implemented and planned). 4-2 Relevant agencies with pilot projects elaborate technical guidelines and utilizes them. 4-3 The relevant agencies discuss and endorse the selection of pilot projects. 4-4 NCEPR and the relevant agencies approve large scale investments based on pilot projects implementation and assessment. 4-5 NCEPR, or the sections of the relevant agencies in charge of allocating funds for air pollution control in the Mongolian government such as the Environment and Climate Fund utilizes the Outputs of the Projects and pilot projects implementation and assessment.	Measurement 2 (12) Clean Coal Technology for Air Pollution Control Measures (13) CEMS Data Analysis (14) Stationary Source Emission Control Measures (15) Air Quality Administration (16) Public Awareness and Public Relations 2. Training (1) Local seminars and workshops (2) Training course in Japan 3. Provision of necessary equipment 4. Local cost Necessary expenses for activity of JICA Experts
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5-1 DAAEP with Health Department of Capital City and the relevant agencies implements public awareness and advisory activities for citizens including school students and parents. 5-2 MET and DAAEP publish progress of the Project by newsletter, newspaper articles, web-site and other medias. 5-3 DAAEP and JICA Experts provide technical guidance to manufacturers for improved fuel production. 5-4 The relevant agencies with JICA Experts implement pilot projects according to the implementation plan by Activity 3-3. 5-5 The relevant agencies with JICA Experts evaluate pilot projects results in terms of emission reduction, air quality improvement and exposure to citizens, and extract lessons learned. 5-6 The relevant agencies with JICA Experts report the pilot projects results to NCEPR. 5-7 TPP3 and TPP4 analyze CEMS data, and examine viable air pollution control measures. 5-8 TPP3 and TPP4 with JICA Experts elaborate emission reduction plans. 6-1 The relevant agencies discuss and elaborate written agreements on demarcation of roles in air quality management related with each Output and Activity of the Project. 6-2 DAAEP with JICA Experts submits technical documents to NCEPR for improved fuel standard, emission standard on stationary sources, mobile sources and other emission sources, and revision of ordinance. 6-3 NCEPR and the relevant agencies elaborate fuel standard and emission standard, and submit them to MASM. 6-4 Relevant ministries / relevant agencies of UB city elaborate laws, regulations and ordinances on air pollution control measures, and submit them to national parliament / city council. 6-5 JICA Experts provide training on air pollution control measures and technical appraisal guidelines for staff of the sections of the relevant agencies in charge of allocating funds for air pollution control. 6-6 Staff of the sections of the relevant agencies in charge of allocating funds for air pollution control with JICA Experts improve relevant operations with allocating funds for air pollution control measures, if necessary. 6-7 Mongolian side enhances donor coordination in air pollution control. 6-8 Relevant agencies of pilot projects with JICA Experts develop an operational guideline for elaboration, implementation and evaluation of air pollution control measures based on pilot projects implementation.	Pre-conditions 1. Appropriate number of qualified staff of C/P and C/P-WG is assigned. 2. Adequate amount of budget related with the Project implementation is secured. 3. Necessary human resources mobilization related with pilot projects is secured by Mongolian side.
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*1 According to Mayoral Order A/1649 "Partial Measures Related to the Abolition of Inspection Agency of the Capital City" dated December 30, 2022, Audit Division was added to DAAEP.

*2 Since the Audit Division and the Air Quality Measurement and Operation Division of DAAEP do not perform simplified measurement, Activity 1-1-4 was terminated through December 30, 2022.

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AQMS: Air Quality Monitoring Station
BAU: Business as Usual
CEMS: Continuous Emission Monitoring System
CFWH: Coal Fired Water Heater
C/P: Counterpart
C/P-WG: Counterpart Working Group
DAAEP: Department of Against Air and Environmental Pollution of Capital City
DPF: Diesel Particulate Filter
FRM: Federal Reference Method
HOB: Heat Only Boiler
IACC: Inspection Agency of the Capital City
MASM: Mongolian Agency for Standardization and Metrology
MET: Ministry of Environment and Tourism
MMHi: Ministry of Mining and Heavy Industry
MNS: Mongolian National Standard
MRPA: Mineral Resources and Petroleum Authority
MRTD: Ministry of Road and Transport Development
NAMEM: National Agency for Meteorology and Environment Monitoring
NCEPR: National Committee for Environment Pollution Reduction
NPREP: National Program on Reducing Environment Pollution
NRTC: National Road Transport Center
PTD: Public Transportation Department of the Capital City
PM: Particulate Matter
RSD: Remote Sensing Device
TCC: Traffic Control Center of the Capital City
TPP: Thermal Power Plant

Quality Control of Emission Data of CEMS of TPP3 (Activity 1-2-2)

2024.05.13, NAMEM and JICA Expert Team

1. Background1

2. Methodology.....1

3. CEMS maintenance including CEMS-check/calibration by TPP3.....1

4. Comparison of CEMS data with DAAEP’s measurement.....2

5. Summary2

6. Appendix..... Error! Bookmark not defined.

1. Background

NAMEM, and JICA Expert Team for “Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3”, prepared this report through the following activities;

1-2-2 TPP3 and TPP4 with JICA Experts perform quality control of emission gas data of CEMS.

2. Methodology

Quality control of emission gas data of CEMS of TPP3 was planned to be done through reviewing CEMS maintenance by TPP3, and CEMS data itself compared with DAAEP’s measurement.

3. CEMS maintenance including CEMS-check/calibration by TPP3

TPP3 submitted CEMS maintenance report dated on 19 June 2023 to NAMEM. According to the report, TPP3 checked, cleaned and repaired CEMS and related pipes fully on 12 and 13 June 2023. Although it is working well by now, it is necessary for the government to allocate some budget for repairment, renewal or additional equipment of CEMS itself, and health-safety-environment equipment related to CEMS. JET-NAMEM confirmed that TPP3 follows the operation manual carefully. According to Internal Control of Stationery Sources of Air Pollution of TPP3¹, TPP3 solved any problem within a short

¹ For examples, 2022.05, 2023-01, and 2023.03 of "ДЦС-3" ТӨХК АГААРЫН БОХИРДЛЫН СУУРИН ЭХ ҮҮСВЭРИЙН ДОТООДЫН ХЯНАЛТЫН МЭДЭЭ”

period whenever CEMS shows some problem.

4. Comparison of CEMS data with DAAEP's measurement

All the measurement data by DAAEP is compared with CEMS data of the date as shown in Table 1. Concentrations of NO_x, CO and TSP showed a larger difference, which may be because of the measurement points difference.

Table 1 Comparison of CEMS data with DAAEP's measurement

Date	Measurement Point	Method	NO _x	SO ₂	CO	TSP
2023.10.20 10:44 – 11:21	Boiler No. 7, БК3-220-100	DAAEP	66	754	2,536	794
(ditto)	Stack for Boilers No. 1 to 7 of БК3-220-100	CEMS of TPP3	515	564	248	77

Unit: mg/m³

5. Summary

TPP3 maintains the CEMS well somehow because CEMS measurement was quickly recovered whenever there was a trouble. Following issues were found, and should be solved.

- 1) Maintenance of CEMS should be reported in written format, including calibration report.
- 2) Some larger differences were found especially on NO_x, CO and TSP concentrations between TPP3's CEMS and DAAEP's measurement, which may be results of measurement points difference. DAAEP measured the exhaust of No. 7 boiler, while CEMS measured the mixed exhaust gas of No. 1 to No. 7 boilers. In order to evaluate CEMS maintenance by DAAEP's measurement precisely, measurement hole for DAAEP is necessary next to CEMS measurement point.

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Technical Information of CEMS, Boilers & Stacks of TPP3 (Activity 1-2)

2024.05.13, NAMEM and JICA Expert Team

1. CEMS	1
2. Boilers.....	1
3. Stacks.....	1
4. Connections.....	2

1. CEMS

Brand: chong qing chuan yi zi dong hua qu fen you xian qong si

(重庆川仪自动化股份有限公司)

Model: PS7400 CEMS (http://www.cgcy.com/content/details335_6451.html)

User name: shang hai chang ai ke ji fa zhan you xian qong si

(上海昶艾科技发展有限公司)

Ranges:	PA200-GXH(II)+O2	SO2: 5000 ppm, NO: 5000 ppm, O2:0-25%
	PA200-GXH	CO: 1000 ppm
	DT600	Dust: 0-300 mg/m3

2. Boilers

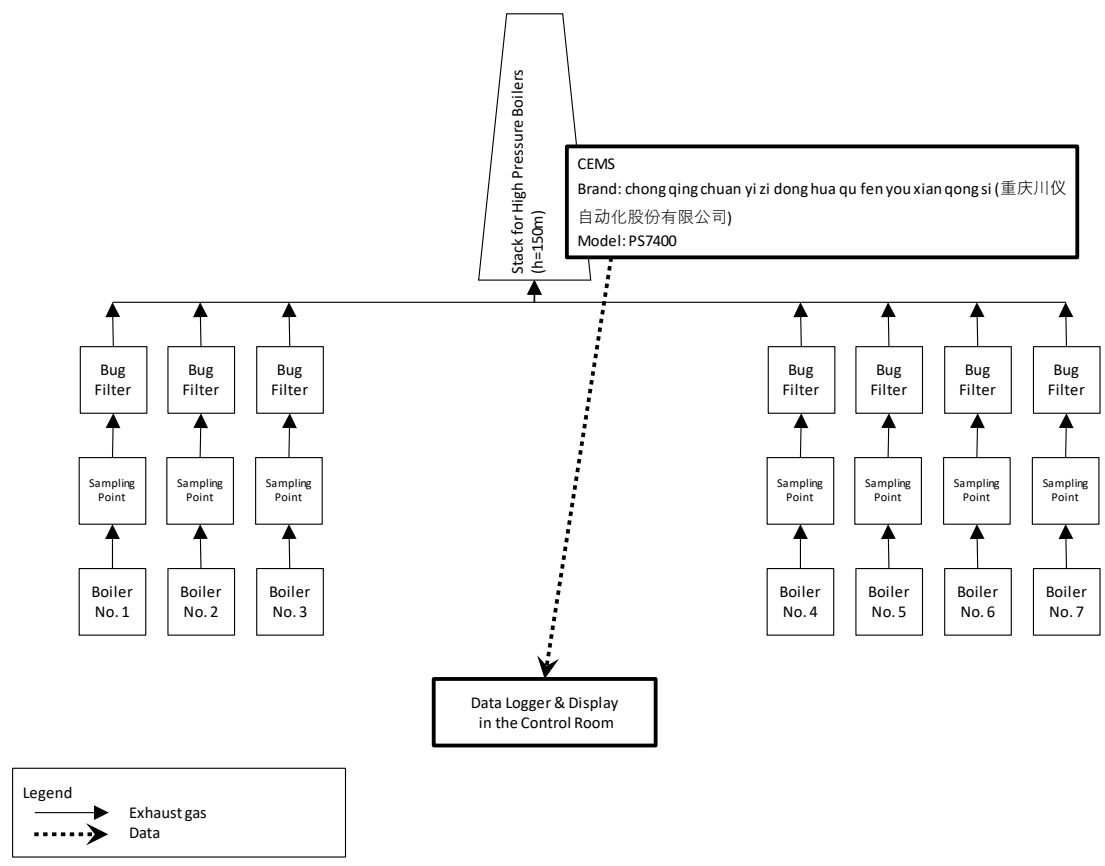
- 7 high pressure boilers (Model БК3-220-100, Capacity 220 ton/hour, Pulverized Coal)
- 4 low pressure boilers (Model Б3К-75-39 ФБ, Capacity 75 ton/hour, Pulverized Coal)
- 2 low pressure boilers (Model Б3К-75-39, Capacity 75 ton/hour, fluidized bed)

3. Stacks

One 150 m height stack for 7 high pressure boilers.

One 100 m height stack for all the other lower pressure boilers.

4. Connections for CEMS



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Quality Control of Emission Data of CEMS of TPP4 (Activity 1-2-2)

2024.05.13, NAMEM and JICA Expert Team

1. Background	1
2. Methodology.....	1
3. CEMS maintenance including CEMS-check/calibration by TPP4.....	1
4. Comparison of CEMS data with DAAEP's measurement.....	2
5. Summary	2

1. Background

NAMEM, and JICA Expert Team for “Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3”, prepared this report through the following activities;

1-2-2 TPP3 and TPP4 with JICA Experts perform quality control of emission gas data of CEMS.

2. Methodology

Quality control of emission gas data of CEMS of TPP4 was planned to be done through reviewing CEMS maintenance by TPP4, and CEMS data itself compared with DAAEP's measurement.

3. CEMS maintenance including CEMS-check/calibration by TPP4

TPP4 could not submit CEMS maintenance/calibration report to JET through NAMEM because of security control against foreigner. Therefore, it could not be evaluated literally. TPP4 explained to JET-NAMEM interview team that TPP4 allocates necessary budget for operation and maintenance, and follows the operation manual carefully.

TPP4 uses the standard gases that were shipped together with CEMS in 2016. Pressures remained in the cylinders were 10 atm or larger. Therefore, it is better to be checked with, or renewed with standard gases within the certified period of traceability certificates.

A touch panel for CEMS sample gas line changer became black out in 2023. TPP4 studied that the black-out is not emergent problem because the gas line changer is functioning, the changer status can be found through the data cable, and the

configuration cannot be changed. TPP4 experts in charge received the quotation to fix it, and started to consider to solution.

TPP4 was looking for suitable standard gases because the last standard gas cylinders were near to vacant. NAMEM supplied potential reliable standard gas suppliers in Ulaanbaatar.

4. Comparison of CEMS data with DAAEP's measurement

All the measurement data by DAAEP is compared with CEMS data of the date as shown in Table 1. Concentrations of NO_x, CO and TSP showed a larger difference, which may be because of the measurement points difference.

Table 1 Comparison of CEMS data with DAAEP's measurement

Date	Boiler	Method	NO _x	SO ₂	CO	TSP
2022.06.29 (time information is lost)	3yyx-7 450 TH-140	DAAEP	370	599	3	139
2022.06.29, average of 6:42 -18:44	3yyx-7 450 TH-140, after filter	CEMS of TPP4	334.1	994.16	1.01	-
2022.06.29, average of	At stack	CEMS of TPP4	-	-	-	22.15

Unit: mg/m³

5. Summary

TPP4 maintains the CEMS well somehow because the CEMS has been calibrated periodically, and CEMS measurement has been continued. Following issues were found, and should be solved.

- 1) The standard gases should be renewed with standard gases within the certified period of traceability certificates.
- 2) Yearly budget should be increased to procure not only consumables, but spare parts such as "touch panel for CEMS sample gas line changer" which is necessary to be replaced much less than consumables.
- 3) Some larger differences were found especially on TSP concentrations between TPP4's CEMS and DAAEP's measurement. However, the sampling points were different. DAAEP measured the exhaust of No. 7 boiler after filter, while CEMS measured the mixed exhaust gas of No. 1 to No. 8 boilers. In order to evaluate CEMS

maintenance by DAAEP's measurement precisely, measurement hole for DAAEP is necessary next to CEMS measurement points.

<<END of Document>>

Technical Information of CEMS, Boilers & Stacks of TPP4 (Activity 1-2)

2024.05.13, NAMEM and JICA Expert Team

1. CEMS	1
1.1. CEMSs for gaseous pollutant concentrations	1
1.2. CEMSs for particulate pollutant concentrations	1
2. Boilers	1
3. Air pollutants removal equipment	2
4. Stacks	2
5. Connections for CEMS	2

1. CEMS

1.1. CEMSs for gaseous pollutant concentrations

Brand: HORIBA (堀場製作所)

Model: ENDA-5800

(<https://www.horiba.com/esp/products/detail/action/show/Product/enda-5000-series-448/>)

Ranges: NOx: 0 ~ 5000 ppm

SO₂: 0 ~ 5000 ppm

CO: 0 ~ 5000 ppm

CO₂: 0 ~ 20 vol %

O₂: 0 ~ 25 vol %

Installation 2 sets (One set is to measure Unit 1 to 4 individually by pipe switcher, and the other for Unit 5 to 8)

1.2. CEMSs for particulate pollutant concentrations

Brand: Tanaka Electric Laboratory (田中電気研究所)

Model: DDM-fC

Ranges: Dust: 0 ~ 500 mg/m³N

Installation Stack

2. Boilers

8 boilers Model BK3-420-140-10C (420 ton/hour, Pulverized Coa)l

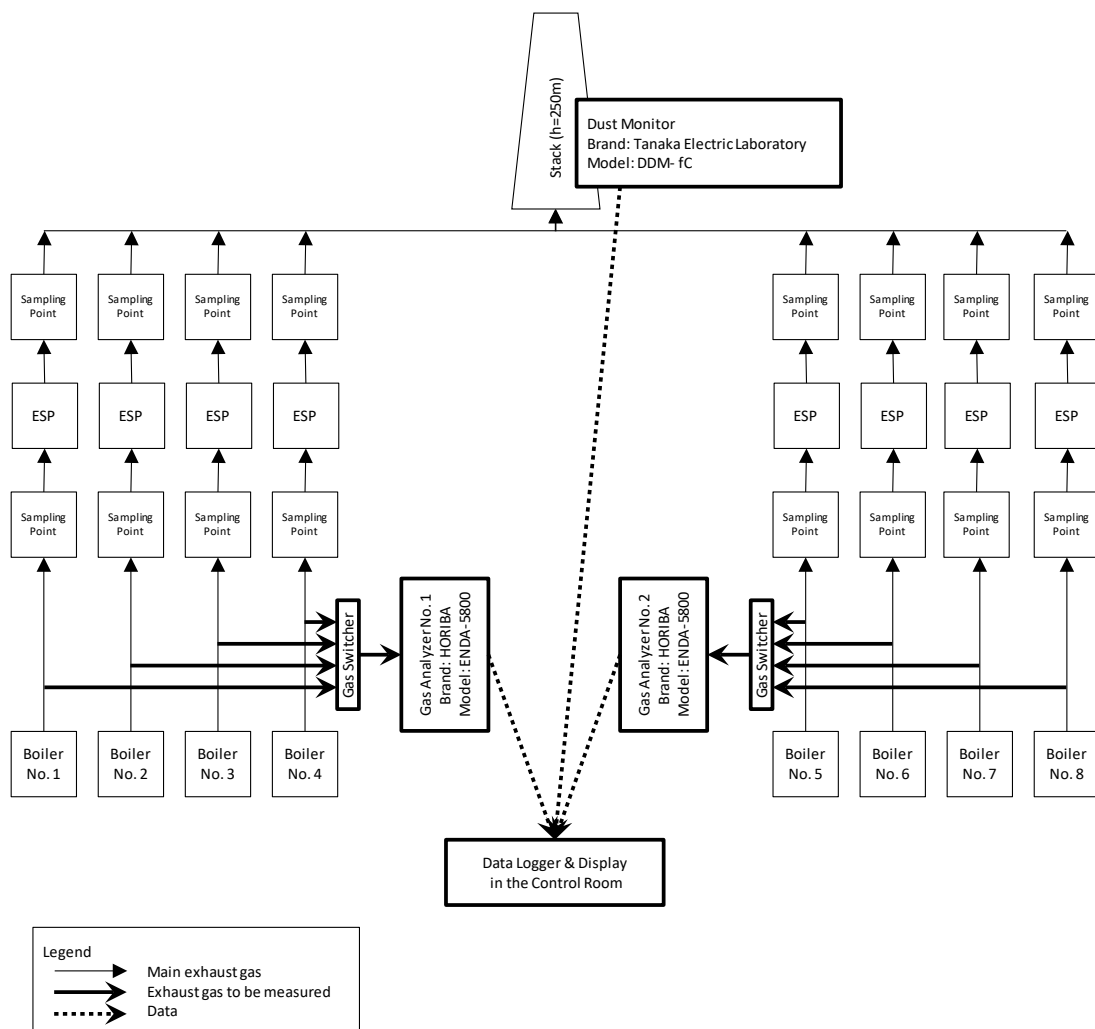
3. Air pollutants removal equipment

ESP (Electrostatic precipitator) Model ЭГА-58-4-6 (Efficiency: 98%) for each boilers

4. Stacks

One 250 m height stack for 8 high pressure boilers.

5. Connections for CEMS



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Emission Monitoring Report of TPP2 for 2023

2024.05.20, NAMEM and JICA Expert Team

1.	Background	1
2.	Methodology.....	1
3.	Emission Standard for TPP2.....	1
4.	Measurement by third parties	2
5.	Measurement by TPP2.....	2
6.	Summary	3
7.	Recommendation.....	3

1. Background

NAMEM, and JICA Expert Team for “Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3”, prepared this report through the following activities;

1-2-4 NAMEM and the relevant agencies share and evaluate CEMS emission data.

1-2-5 NAMEM compiles monitoring data of emissions from TPP2, TPP3, TPP4 and new large heat supply facilities and share them with relevant agencies.

2. Methodology

NAMEM, and the JICA Expert Team, collected emission measurement data in 2023 from TPP2 and third parties, and compared with emission standard.

3. Emission Standard for TPP2

Emission standard applied for TPP2 is “Maximum acceptable level and measuring method of air pollutants in the exhaust gases from the steam and hot water boilers of TPP and Thermal stations” (MNS 5919:2008). Key conditions, and maximum acceptable level of MNS 5919:2008 for the current boilers of TPP2 are shown in the tables below;

Table 1 Key Conditions for Emission Standard for TPP2 (MNS 5919:2008)

Standard Condition	101,325 Pa, 273 K
Excess air coefficient	1.4 (Pollutant concentration should be converted to the condition that O ₂ concentration in the exhaust is 6.0%)

Table 2 Maximum Acceptable Level for TPP2 (MNS 5919:2008)

No.	Boiler Model	Capacity (ton/hour)	Fireplace Type	NOx	SO2	CO	Dust
K-1	ТС-35А-2, БУШ	35	Буцлах давхаргатай (fluidized bed)	(660)	(1560)	(865)	(7300)
K-2	DHF-35-38- 3,82/450А, БУШ	35	Буцлах давхаргатай (fluidized bed)	(660)	(1560)	(865)	(7300)
K-3	ТС-35А-2, ул ширэмт	35	ул ширэмтэй (Iron Bottom)	(950)	(1690)	(960)	(10900)
K-4	БКЗ-75-39ФБ, БУШ	75	Буцлах давхаргатай (fluidized bed)	320	615	6245	1200
K-5	БКЗ-75-39ФБ, БУШ	75	Буцлах давхаргатай (fluidized bed)	320	615	6245	1200

Unit: mg/Nm³

Note: Standards for the capacity and the fireplace type of K-1, K-2 and K-3 are not defined in MNS 5919:2008, standards for the nearest capacity are applied conventionally. Those standards are shown with “()” in this table.

4. Measurement by third parties

Measurement in 2023 by third parties could not be found. Table 3 shows the air pollutant concentration of the last measurement by DAAEP. TPP2 fulfilled the emission standards for all the air pollutants.

Table 3 Pollutant Concentration measured by DAAEP on 2022.06.30

Boiler Model	NOx	SO2	CO	Dust
Standard for БКЗ-75-39	320	615	6245	1200
БКЗ-75-39 (2022.06.30)	218	455	40	139

Unit: mg/Nm³ at the standard condition defined in the standard (101,325 Pa, 273 K, O₂=6%)

5. Measurement by TPP2

According to a regulation of Mongolia “Монгол улсын байгаль орчин, аялал жуулчлалын сайдын тушаал” (A/222, 2028.07.04), TPP2 monthly measures air pollutants concentration in the exhaust gas by TESTO 350 manually, and shares the data with NAMEM. Table 4 shows its summary.

TPP2 did not measured dust concentration. Therefore, dust concentration of TPP2 flue gas cannot be compared with the emission standards. All the concentrations of NOx,

SO₂ and CO of all the boilers fulfilled the emission standard.

Table 4 Pollutant Concentration Compared with the Standard MNS 5919:2008

Boiler No.	Boiler Model	Capacity (ton/hour)	Fireplace Type		NO _x	SO ₂	CO	Dust
K-1	TC-35A-2, БУШ	35	Буцлах давхаргатай (fluidized bed)	Standard	(660)	(1560)	(865)	(7300)
				Measured	88.0	160	18.0	-
K-2	DHF-35-38-3,82/450A, БУШ	35	Буцлах давхаргатай (fluidized bed)	Standard	(660)	(1560)	(865)	(7300)
				Measured	167.0	215	1.0	-
K-3	TC-35A-2, ул ширэмт	35	ул ширэмтэй (Iron Bottom)	Standard	(950)	(1690)	(960)	(10900)
				Measured	156.0	210	55.0	-
K-4	БКЗ-75-39ФБ, БУШ	75	Буцлах давхаргатай (fluidized bed)	Standard	320	615	6245	1200
				Measured	101.0	180	13.0	-
K-5	БКЗ-75-39ФБ, БУШ	75	Буцлах давхаргатай (fluidized bed)	Standard	320	615	6245	1200
				Measured	78	167	15	-

Unit: mg/Nm³ at the standard condition defined in the standard (101,325 Pa, 273 K, O₂=6%)

Remark: Standards for the capacity and the fireplace type of K-1, K-2 and K-3 are not defined in MNS 5919:2008, standards for the nearest capacity are applied conventionally. Those standards are shown with “()” in this table.

6. Summary

All the concentration data of flue gas fulfilled the emission standard. However, TPP2 did not measured dust concentration.

7. Recommendation

Government is recommended to request TPP2 to measure dust concentration. TPP2 would be able to do it when the necessary budget of measurement is authorized by the Government.

Common recommendations for TPP2, TPP3, TPP4 and Amgalan Heat Plant are summarized in another report.

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Technical Information of CEMS, Boilers & Stacks of TPP2 (Activity 1-2)

2023.12.01, NAMEM and JICA Expert Team

1. CEMS	1
2. Boilers.....	1
3. Stacks.....	1
4. Connections.....	Error! Bookmark not defined.

1. CEMS

There is no CEMS installed.

2. Boilers

5 boilers as shown in the table below.

Table 1 Boilers of TPP2

No.	Model	Boiler Capacity	Fire type
K-1	TC-35A-2, БУШ	35 ton/hour	Буцлах давхаргатай (fluidized bed)
K-2	DHF-35-38-3,82/450A, БУШ	35 ton/hour	Буцлах давхаргатай (fluidized bed)
K-3	TC-35A-2, ул ширэмт	35 ton/hour	ул ширэмтэй (Iron Bottom)
K-4	БКЗ-75-39ФБ, БУШ	75 ton/hour	Буцлах давхаргатай (fluidized bed)
K-5	БКЗ-75-39ФБ, БУШ	75 ton/hour	Буцлах давхаргатай (fluidized bed)

3. Stacks

One 100 m height stack for all the boilers.

<<END of Document>>

Emission Monitoring Report of TPP3 for 2023

2024.05.16, NAMEM and JICA Expert Team

1. Background	1
2. Methodology.....	1
3. Emission Standard for TPP3.....	1
4. Measurement by third parties	2
5. Measurement by TPP3.....	2
6. Summary	3
7. Recommendation.....	3

1. Background

NAMEM, and JICA Expert Team for “Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3”, prepared this report through the following activities;

1-2-4 NAMEM and the relevant agencies share and evaluate CEMS emission data.

1-2-5 NAMEM compiles monitoring data of emissions from TPP2, TPP3, TPP4 and new large heat supply facilities and share them with relevant agencies.

2. Methodology

NAMEM, and the JICA Expert Team, collected emission measurement data in 2023 from TPP3 and third parties, and compared with emission standard.

3. Emission Standard for TPP3

Emission standard applied for TPP3 is “Maximum acceptable level and measuring method of air pollutants in the exhaust gases from the steam and hot water boilers of TPP and Thermal stations” (MNS 5919:2008). Key conditions, and maximum acceptable level of MNS 5919:2008 for the current boilers of TPP3 are shown in the tables below;

Table 1 Key Conditions for Emission Standard for TPP3 (MNS 5919:2008)

Standard Condition	101,325 Pa, 273 K
Excess air coefficient	1.4 (Pollutant concentration should be converted to the condition that O ₂ concentration in the exhaust is 6.0%)

Table 2 Maximum Acceptable Level for TPP3 (MNS 5919:2008)

Boiler Model	Capacity (ton/hour)	Fireplace Type	NOx	SO ₂	CO	Dust
ӨНДӨР ДАРАЛТЫН ХЭСГИЙН УТААНЫ ЯНДАН БКЗ-220-100 МАЯГИЙН ЗУУХ	220	Тоосон нүүрсний эзлэхүүний (Pulverized Coal)	1100.0	1485	300	10800
ДӨЛТ ШАТАЛТТАЙ БЗК-75-39 МАЯГИЙН ЗУУХ	75	Тоосон нүүрсний эзлэхүүний (Pulverized Coal)	1270	1931.8	3547.1	21000
БУЦАЛГАГЧ ҮЕТ ШАТАЛТТАЙ ЗУУХ / БКЗ-75-39 /	75	Буцлах давхаргатай (Fluidized bed)	320	615	6245	1200

Unit: mg/Nm³**4. Measurement by third parties**

In response to NAMEM's request, DAAEP measured emission of BKZ220/110 No. 7 of TPP3 on 2023.10.20, from 10:44 until 11:21. The concentration of air pollutants are shown in Table 3. TPP3 fulfilled the emission standards for SO₂, NO_x and Dust, and did not fulfilled the emission standard for CO.

Table 3 Pollutant Concentration measured by DAAEP on 2023.10.20

Boiler Model	SO ₂	NO _x	CO	Dust
Standard for БКЗ-220-100	1485	1100.0	300	10800
BKZ220/110 No. 7	754	66	2,536	795

Unit: mg/Nm³ at the standard condition defined in the standard (101,325 Pa, 273 K, O₂=6%)**5. Measurement by TPP3**

According to a regulation of Mongolia “Монгол улсын байгаль орчин, аялал жуулчлалын сайдын тушаал” (A/222, 2028.07.04), TPP3 measures the exhaust of 220 (ton/hour) boilers at the stack continuously by CEMS Model PS 7400, and reports its daily average to NAMEM. TPP3 measures exhausts of other boilers periodically by TESTO-350 XL and reports their monthly average to NAMEM. Table 4 shows its summary.

Regarding the stack for high pressure boilers, TPP3 always fulfilled the emission standards for SO₂, NO_x and Dust. TPP3 generally fulfilled the emission standard for CO, although did not fulfilled the emission standard for CO for 86 days, generally continuous

from 2023.01.03 to 2023.03.31.

Regarding the exhaust of middle pressure boilers, TPP3 always fulfilled the emission standards for all the pollutants measured (SO₂, NO_x and CO). However, Any dust concentration was not reported for middle pressure boilers

Table 4 Pollutant Concentration Compared with the Standard MNS 5919:2008

Boiler Model	SO ₂	NO _x	CO	Dust
Standard for БК3-220-100	1485	1100.0	300	10800
Average	669	686	264	399
Maximum	767	886	361	698
Minimum	489	453	159	54
Standard for Б3К-75-39 (Pulverized Coal)	1931.8	1270	3547.1	21000
Average	1,109	877	1,480	No measurement
Maximum	1,543	998	1,925	
Minimum	699	703	956	
Standard for БК3-75-39 (Fluidized bed)	615	320	6245	1200
Average	427	281	1,877	No measurement
Maximum	438	318	2,598	
Minimum	406	240	1,227	

Unit: mg/Nm³ at the standard condition defined in the standard (101,325 Pa, 273 K, O₂=6%)

Remark: TPP3 does not report dust concentrations of middle pressure boilers because TPP3 does not has any equipment to measure dust concentration in the exhaust.

6. Summary

Concentration of CO of higher pressure boiler exhaust did not fulfilled the standard especially in higher load period. Dust concentration of middle pressure boilers were not measured. All the other pollutants/boilers always meet the standard.

7. Recommendation

Government is recommended to request TPP3 to measure dust concentration of middle pressure boilers, according to a regulation of Mongolia “Монгол улсын байгаль орчин, аялал жуулчлалын сайдын тушаал” (A/222, 2028.07.04). TPP3 would be able to follow the request by requesting necessary budget from the TPP3 owner, the Mongolian Government, and then by ordering it from DAAEP, or by buying a set of equipment to measure dust concentration by isokinetic suction.

Government is recommended to request TPP3 to continue CEMS data online transfer.

TPP3 would be able to follow the request by requesting necessary budget from the TPP3 owner, the Mongolian Government.

Government is recommended to request TPP3 to follow the emission standard. TPP3 would be able to follow the request by adjusting the boiler operation, and or by requesting necessary budget for equipment improvement from the owner, the Mongolian Government.

Common recommendations for TPP2, TPP3, TPP4 and Amgalan Heat Plant are summarized in another report.

<<End of Document>>

Technical Information of CEMS, Boilers & Stacks of TPP3 (Activity 1-2)

2024.05.13, NAMEM and JICA Expert Team

1. CEMS	1
2. Boilers.....	1
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4. Connections.....	2

1. CEMS

Brand: chong qing chuan yi zi dong hua qu fen you xian qong si

(重庆川仪自动化股份有限公司)

Model: PS7400 CEMS (http://www.cgcy.com/content/details335_6451.html)

User name: shang hai chang ai ke ji fa zhan you xian qong si

(上海昶艾科技发展有限公司)

Ranges:	PA200-GXH(II)+O2	SO2: 5000 ppm, NO: 5000 ppm, O2:0-25%
	PA200-GXH	CO: 1000 ppm
	DT600	Dust: 0-300 mg/m3

2. Boilers

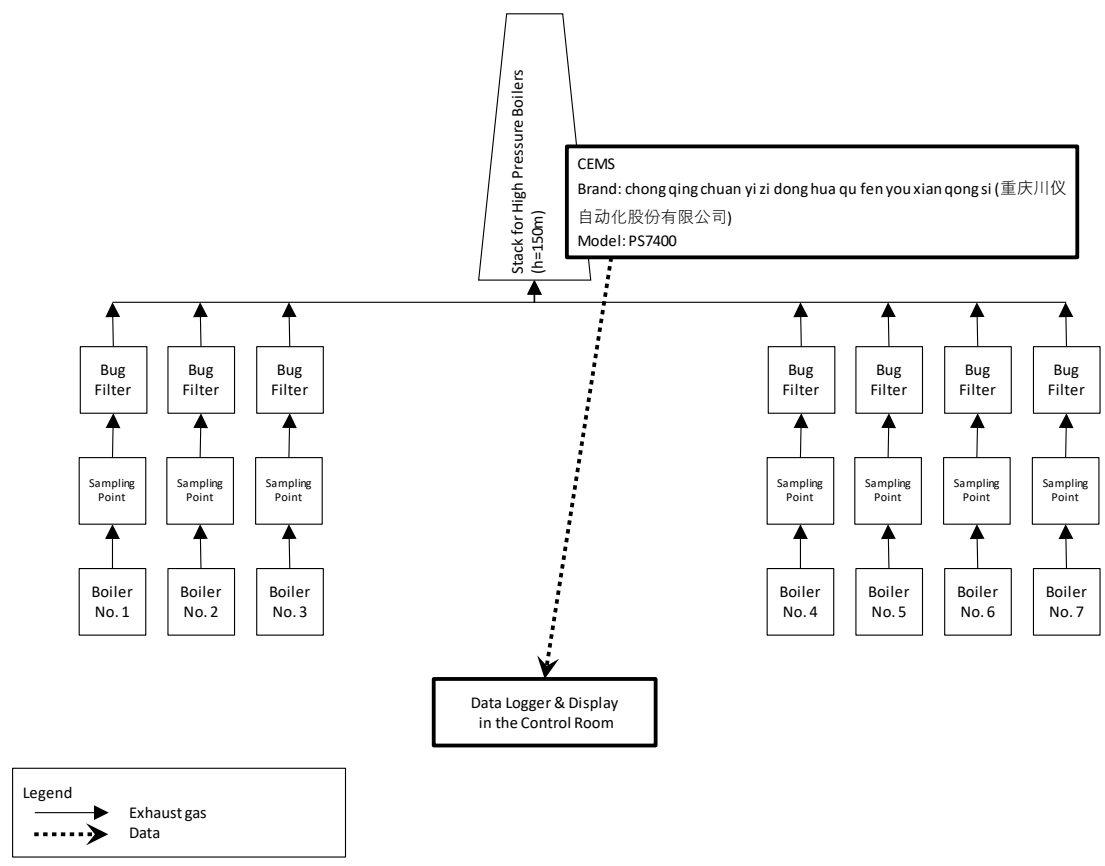
- 7 high pressure boilers (Model БК3-220-100, Capacity 220 ton/hour, Pulverized Coal)
- 4 low pressure boilers (Model Б3К-75-39 ФБ, Capacity 75 ton/hour, Pulverized Coal)
- 2 low pressure boilers (Model Б3К-75-39, Capacity 75 ton/hour, fluidized bed)

3. Stacks

One 150 m height stack for 7 high pressure boilers.

One 100 m height stack for all the other lower pressure boilers.

4. Connections for CEMS



<<END of Document>>

Emission Monitoring Report of TPP4 for 2023

2024.05.20, NAMEM and JICA Expert Team

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6. Summary	3
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1. Background

NAMEM, and JICA Expert Team for “Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3”, prepared this report through the following activities;

1-2-4 NAMEM and the relevant agencies share and evaluate CEMS emission data.

1-2-5 NAMEM compiles monitoring data of emissions from TPP2, TPP3, TPP4 and new large heat supply facilities and share them with relevant agencies.

2. Methodology

NAMEM, and the JICA Expert Team, collected emission measurement data in 2023 from TPP4 and third parties, and compared with emission standard.

3. Emission Standard for TPP4

Emission standard applied for TPP4 is “Maximum acceptable level and measuring method of air pollutants in the exhaust gases from the steam and hot water boilers of TPP and Thermal stations” (MNS 5919:2008). Key conditions, and maximum acceptable level of MNS 5919:2008 for the current boilers of TPP4 are shown in the tables below;

Table 1 Key Conditions for Emission Standard for TPP4 (MNS 5919:2008)

Standard Condition	101,325 Pa, 273 K
Excess air coefficient	1.4 (Pollutant concentration should be converted to the condition that O ₂ concentration in the exhaust is 6.0%)

Table 2 Maximum Acceptable Level for TPP4 (MNS 5919:2008)

Boiler Model	Capacity (ton/hour)	Fireplace Type	NOx	SO ₂	CO	Dust
БКЗ-420-140-10С	420	Тоосон нүүрсний эзлэхүүний (Pulverized Coal)	715.0	1200	180	200

Unit: mg/Nm³**4. Measurement by third parties**

Measurement in 2023 by third parties could not be found even though NAMEM requested DAAEP it. Table 3 shows the air pollutant concentration of the last measurement by DAAEP. TPP4 fulfilled the emission standards for all the air pollutants.

Table 3 Pollutant Concentration measured by DAAEP on 2022.06.29

Boiler Model	NOx	SO ₂	CO	Dust
Standard for БКЗ-420-140-10С	715.0	1200	180	200
450 ton-140 No. 7 after ESP (2022.06.29)	370	599	3	139

Unit: mg/Nm³ at the standard condition defined in the standard (101,325 Pa, 273 K, O₂=6%)**5. Measurement by TPP4**

According to a regulation of Mongolia “Монгол улсын байгаль орчин, аялал жуулчлалын сайдын тушаал” (A/222, 2028.07.04), TPP4 measures air pollutants concentration in the exhaust gas by CEMS, and shares the data with NAMEM and related ministries and agencies. Table 4 shows its summary.

Averages: Averages of the most boilers and pollutants fulfilled the emission standards. Only SO₂ concentration average of Boiler No. 3 did not fulfilled the emission standard. However, SO₂ concentration at the stack may fulfilled the emission standards continuously because exhaust of 8 boilers are mixed before the stack.

Maximum: SO₂ concentration tended to be higher than the emission standards, mainly from the end of January until February. Dust concentration did not fulfill the emission standard rarely, almost continuously from 2023-05-07 20:51 until 22:11.

Table 4 Pollutant Concentration Compared with the Standard MNS 5919:2008

Boiler No.		NOx	SO ₂	CO	Dust
	Standard for БК3-420-140-10C	715.0	1200	180	200
1	Average	281.88	962.25	0.05	-
	Maximum	356.70	7,223.41	46.75	-
	Minimum	0.00	0.00	0.00	-
	Measurement over than the Standard	0.00%	21.37%	0.00%	-
2	Average	233.87	999.20	0.19	-
	Maximum	340.80	2,066.03	125.75	-
	Minimum	57.30	58.97	0.00	-
	Measurement over than the Standard	0.00%	40.01%	0.00%	-
3	Average	242.50	1,207.50	1.48	-
	Maximum	337.80	7,210.12	4,000.00	-
	Minimum	0.00	0.00	0.00	-
	Measurement over than the Standard	0.00%	56.75%	0.08%	-
4	Average	267.14	1,053.46	0.49	-
	Maximum	355.80	7,273.88	3,384.25	-
	Minimum	0.00	0.00	0.00	-
	Measurement over than the Standard	0.00%	34.86%	0.01%	-
5	Average	238.00	726.92	0.87	-
	Maximum	4,127.70	1,476.34	870.25	-
	Minimum	45.00	8.50	0.00	-
	Measurement over than the Standard	0.01%	0.29%	0.02%	-
6	Average	249.46	783.45	1.18	-
	Maximum	393.00	1,616.59	3,778.00	-
	Minimum	57.30	17.53	0.00	-
	Measurement over than the Standard	0.00%	0.80%	0.02%	-
7	Average	246.61	756.26	0.90	-
	Maximum	382.80	1,590.56	1,428.00	-
	Minimum	51.90	17.00	0.00	-
	Measurement over than the Standard	0.00%	0.35%	0.03%	-
8	Average	298.39	784.72	1.12	-
	Maximum	438.30	1,572.50	2,141.25	-
	Minimum	75.60	3.19	0.00	-
	Measurement over than the Standard	0.00%	0.56%	0.04%	-
Stack	Average	-	-	-	17.36
	Maximum	-	-	-	392.69
	Minimum	-	-	-	2.06
	Measurement over than the Standard	-	-	-	0.07%

Unit: mg/Nm³ at the standard condition defined in the standard (101,325 Pa, 273 K, O₂=6%)

Remark: CEMS for gaseous pollutants of TPP4 measures boilers individually. CEMS for dust of TPP4 measures the stack where 8 boilers exhausts are mixed.

6. Summary

Concentration of NOx, CO and dust generally fulfilled the emission standard. Concentration of SO₂ often did not fulfilled the emission standard, especially from the end of January until February.

7. Recommendation

Government is recommended to request TPP4 to follow the emission standard. TPP4 would be able to follow the request by requesting coals of which sulfur contents is much lower, or budget to install flue gas desulfurization facility from the owner, the Mongolian Government.

Common recommendations for TPP2, TPP3, TPP4 and Amgalan Heat Plant are summarized in another report.

<<End of Document>>

Technical Information of CEMS, Boilers & Stacks of TPP4 (Activity 1-2)

2024.05.13, NAMEM and JICA Expert Team

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1.1. CEMSs for gaseous pollutant concentrations	1
1.2. CEMSs for particulate pollutant concentrations	1
2. Boilers	1
3. Air pollutants removal equipment	2
4. Stacks	2
5. Connections for CEMS	2

1. CEMS

1.1. CEMSs for gaseous pollutant concentrations

Brand: HORIBA (堀場製作所)

Model: ENDA-5800

(<https://www.horiba.com/esp/products/detail/action/show/Product/enda-5000-series-448/>)

Ranges: NOx: 0 ~ 5000 ppm

SO₂: 0 ~ 5000 ppm

CO: 0 ~ 5000 ppm

CO₂: 0 ~ 20 vol %

O₂: 0 ~ 25 vol %

Installation 2 sets (One set is to measure Unit 1 to 4 individually by pipe switcher, and the other for Unit 5 to 8)

1.2. CEMSs for particulate pollutant concentrations

Brand: Tanaka Electric Laboratory (田中電気研究所)

Model: DDM-fC

Ranges: Dust: 0 ~ 500 mg/m³N

Installation Stack

2. Boilers

8 boilers Model BK3-420-140-10C (420 ton/hour, Pulverized Coa)l

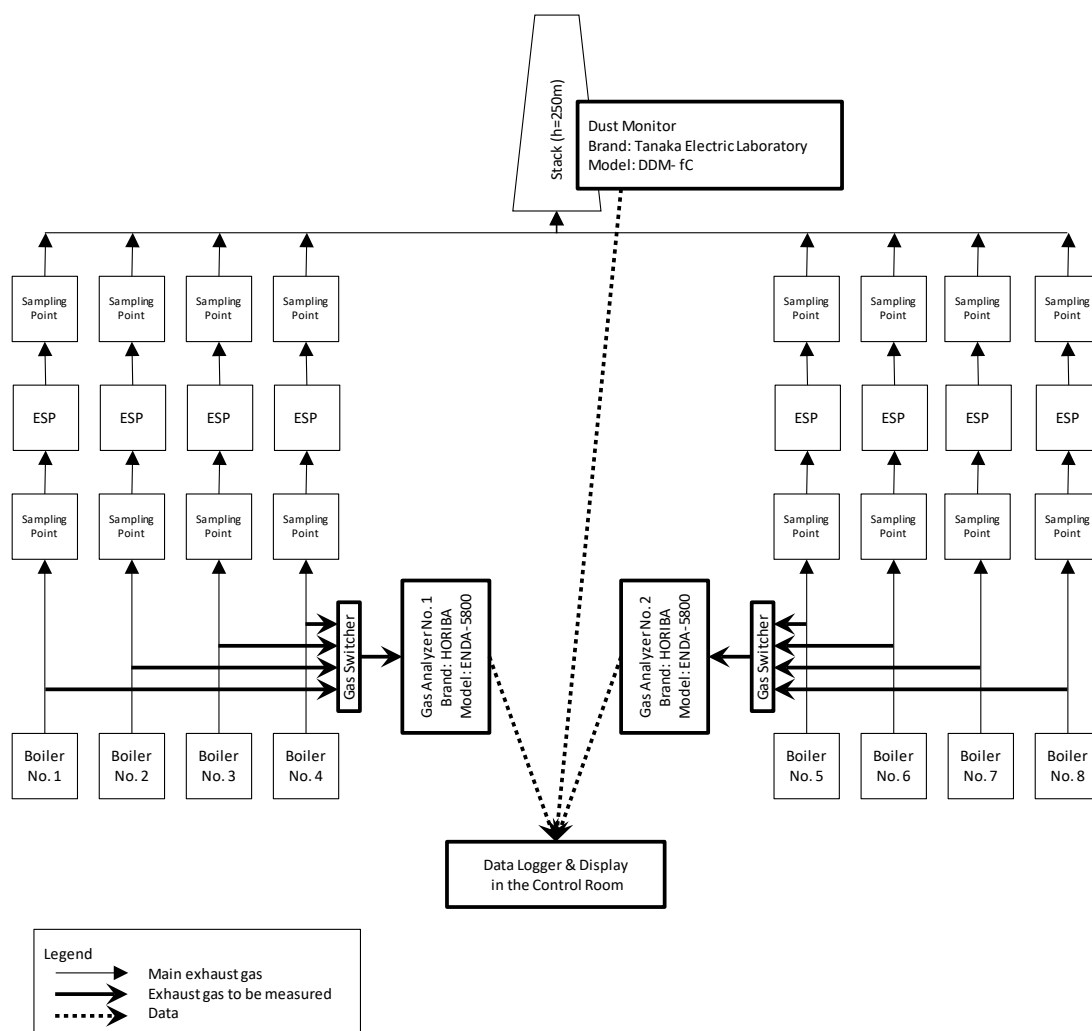
3. Air pollutants removal equipment

ESP (Electrostatic precipitator) Model ЭГА-58-4-6 (Efficiency: 98%) for each boilers

4. Stacks

One 250 m height stack for 8 high pressure boilers.

5. Connections for CEMS



<<END of Document>>

Emission Monitoring Report of Amgalan Heat Plant for 2023

2024.05.20, NAMEM and JICA Expert Team

1. Background	1
2. Methodology.....	1
3. Emission Standard for Amgalan Heat Plant.....	1
4. Measurement by third parties	2
5. Measurement by Amgalan Heat Plant.....	2
6. Summary	3
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1. Background

NAMEM, and JICA Expert Team for “Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 3”, prepared this report through the following activities;

1-2-4 NAMEM and the relevant agencies share and evaluate CEMS emission data.

1-2-5 NAMEM compiles monitoring data of emissions from TPP2, TPP3, TPP4 and new large heat supply facilities and share them with relevant agencies.

2. Methodology

NAMEM, and the JICA Expert Team, collected emission measurement data in 2023 from Amgalan Heat Plant and third parties, and compared with emission standard.

3. Emission Standard for Amgalan Heat Plant

Emission standard applied for Amgalan Heat Plant is “Maximum permissible level and measuring method of air pollutants in flue gas of new Thermal Power Plant and Thermal plant” (MNS 6298:2011). Key conditions, and maximum acceptable level of MNS 6298:2011 for the current population density and fuel of Amgalan Heat Plant are shown in the tables below;

Table 1 Key Conditions for Emission Standard for Amgalan Heat Plant (MNS 6298:2011)

Standard Condition	101,325 Pa, 273 K
Excess air coefficient	1.4 (Pollutant concentration should be converted to the condition that O ₂ concentration in the exhaust is 6.0%)
Population density	339 persons per km ²
Volatile matter content	Larger than 20 % of most of the samples

Remarks:

- Population of Ulaanbaatar in 2022 was 1596.3 (thousand) (<http://ubstat.mn/StatTable=20> , checked in Mar. 2024)
- Area of Ulaanbaatar in 2022 was 470444 ha (<http://ubstat.mn/StatTable=45> , checked in Mar. 2024)

Table 2 Maximum Acceptable Level for Amgalan Heat Plant (MNS 6298:2011)

No.	Boiler Model	NOx	SO ₂	CO	Dust
14031~14033	QXF 116-1.6/130/70-L 116 MW	450	400	180	50

Unit: mg/Nm³

Note: NOx emission standards for coal of which volatile matter content is less than 20% are 650 or 1100 mg/Nm³. SO₂, CO and dust emission standards for the area of which population density is less than 10 persons per km² are 600, 300 and 200 respectively.

4. Measurement by third parties

Measurement in 2023 by third parties could not be found. Table 3 shows the air pollutant concentration of the last measurements by Experiment and Research Center for Boiler, Mongolian University of Science and Technology (MUST). SO₂ concentration was 1.23 to 4.31 times or more than the emission standard. NOx concentration was 1.01 to 1.34 times higher than the emission standard. CO and dust concentrations were less than the emission standard.

Table 3 Pollutant Concentration measured by MUST

Date	Boiler	NOx	SO ₂	CO	Dust
	Standard	450	400	180	50
2021-11-28	K-2	531.67	1630.67	5	5.6
	K-3	602.57	1724.29	0	5.53
2022-03-27	K-2	457	864.2	8.5	34.92
	K-3	482	589.6	7	47.81

Unit: mg/Nm³ at the standard condition defined in the standard (101,325 Pa, 273 K, O₂=6%)

5. Measurement by Amgalan Heat Plant

According to a regulation of Mongolia “Монгол улсын байгаль орчин, аялал

жуулчлалын сайдын тушаал” (A/222, 2028.07.04), Amgalan Heat Plant must measure air pollutants concentration in the exhaust gas monthly, and shares the data with NAMEM.

Although Amgalan Heat Plant requested MUST for the exhaust gas as shown in Table 3, the data submitted to NAMEM was not monthly data.

6. Summary

Amgalan Heat Plant is requested to measure air pollutant concentration monthly, and submit the data to NAMEM. However, the submitted data was not monthly data. Concentrations of SO₂ and NO_x in the exhaust gas were over than the emission standard.

7. Recommendation

Government is recommended to request Amgalan Heat Plant to measure its exhaust monthly. Amgalan Heat Plant would be able do it when the necessary budget of measurement is authorized by the Government.

Government is recommended to request Amgalan Heat Plant to control its emission. It would be realized if budget will be authorized to design countermeasures. SO₂ emission standard may be achieved by installing and operating desulfurization equipment, or using coals of which sulfur contents is much lower. NO_x emission standard may be achieved by installing and operating denitration equipment, or using coals of which volatile matter content is less than 20%¹.

Common recommendations for TPP2, TPP3, TPP4 and Amgalan Heat Plant are summarized in another report.

<<End of Document>>

¹ NO_x emission standard for using coals of which volatile matter content is less than 20% is 650 or 1100 mg/Nm³

Technical Information of CEMS, Boilers & Stacks of Amgalan Heat Plant
(Activity 1-2)

2024.05.20, NAMEM and JICA Expert Team

1. CEMS	1
2. Boilers.....	1
3. Stacks.....	1
4. Connections.....	Error! Bookmark not defined.

1. CEMS

There is no CEMS installed.

2. Boilers

3 boilers as shown in the table below.

Table 1 Boilers of Amgalan Heat Plant

No.	Model
14031	QXF 116-1.6/130/70-L 116 MW
14032	(ditto.)
14033	(ditto.)

3. Stacks

One 120 m height stack for all the boilers.

<<END of Document>>

Common Recommendations

2024.05.20, NAMEM and JICA Expert Team

1. Designating Air Quality Specialist Organization	1
2. Defining Serious Case	1
3. Making flue gas monitoring report of power plants and heat supply facilities	1
4. Excess air coefficient	2
5. Installing CEMS to all the stacks of power plants and heat supply stations	2
6. Revising emission standards MNS 5919:2008 and MNS 6298:2011	2
7. Flue Gas Measurement by Third Party	2

1. Designating Air Quality Specialist Organization

On 2021-11-28, SO₂ concentration of the flue gas of Boiler “K-3” of Amgalan Heat Plant was 4.31 times higher than “Maximum permissible level and measuring method of air pollutants in flue gas of new Thermal Power Plant and Thermal plant (MNS 6298:2011)”. “Air Law” defines “air quality specialist organization” to control power plants. However, no organization is designated by now. Therefore, there is no governmental action by now. It is recommended to revise legal environment to establish a new organization or designate any existing organization as “air quality specialist organization”, and allocate budget and experts necessary to control power plants emissions.

2. Defining Serious Case

“Air Law” defines “Measures to be taken when air pollution and negative physical effects increase seriously”. However, it cannot be announced by now. It is recommended to revise legal environment to define serious case, and necessary procedure.

3. Reporting flue gas monitoring of power plants and heat supply facilities

Followings are recommended to be restarted or continued;

- Maintenance of CEMS by power plants, including enough budget allocation for periodical procurement of traceable and certified standard gases, spare parts and repairment, and renewal of CEMS itself,
- Measuring flue gas by CEMS or monthly measurement by power plants,
- Sending CEMS data online to <http://cems.agaar.mn> by power plants,
- Sending monthly measurement data to NAMEM,
- Maintaining <http://cems.agaar.mn> by Ministry of Environment and Tourism,

- f) Comparing flue gas data with emission standard by power plants or NAMEM,
- g) Reporting by NAMEM or any division of government, and
- h) Allocating necessary budget by government.

4. Excess air coefficient

Excess air coefficient is defined in the emission standards such as MNS 5919-2008 and MNS 6298-2011. However, most of the Mongolian experts concerned did not know how to calculate from concentration-measured to concentration-in-standard-condition. None of the Mongolian experts concerned found errors in the calculation related to excess air coefficient. Followings are recommended.

- a) Educating engineers widely on excess air coefficient,
- b) Government request to measure and submit O₂ concentration whenever powerplants measures flue gas.

5. Installing CEMS to all the stacks of power plants and heat supply stations

CEMS is not installed at the shorter stack of TPP3, the stack of TPP2, and the stack of Amgalan Heat Station. Gas analyzing CEMS is not installed at the stack of TPP4. It is recommended to install CEMSs to all the stacks mentioned here.

6. Revising emission standards MNS 5919:2008 and MNS 6298:2011

Emission standard “Maximum acceptable level and measuring method of air pollutants in the exhaust gases from the steam and hot water boilers of TPP and Thermal stations (MNS 5919:2008)” are categorized by capacity and boiler types. After the boiler upgrade of TPP2, there is no emission standard for Boilers K-1, K-2 and K-3 of TPP2. Emission standard for the types and capacities of TPP2 boilers are necessary to be defined. Therefore, MNS 5919:2008 is recommended to be revised.

NO_x concentration of Amgalan Heat Plant was 457~602.57 mg/Nm³, which were over than the standard (450) since the plant used coals of which volatile matter content was larger than 20%. However, if they uses coals of which volatile matter content is less than 20%, they would be less than the standard (650), even though the effect on air quality may be same. It may be better to be revised also.

7. Flue Gas Measurement by Third Party

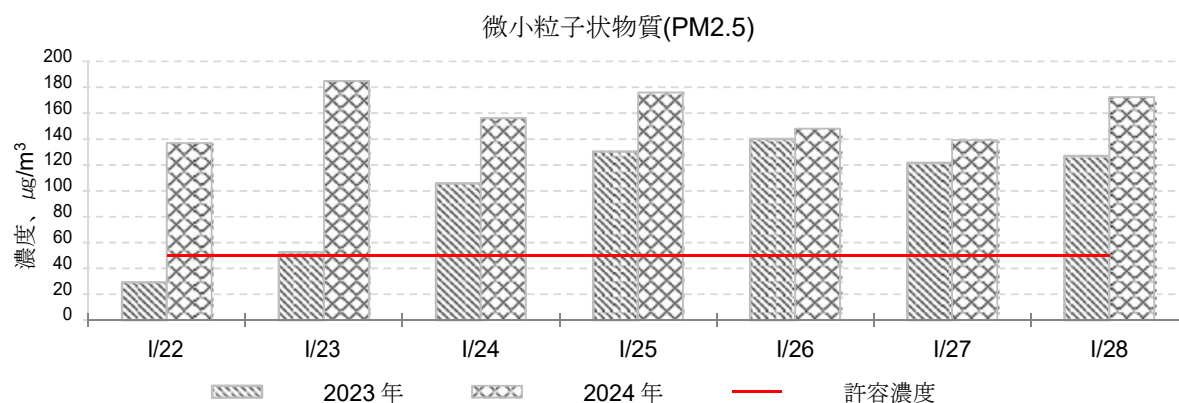
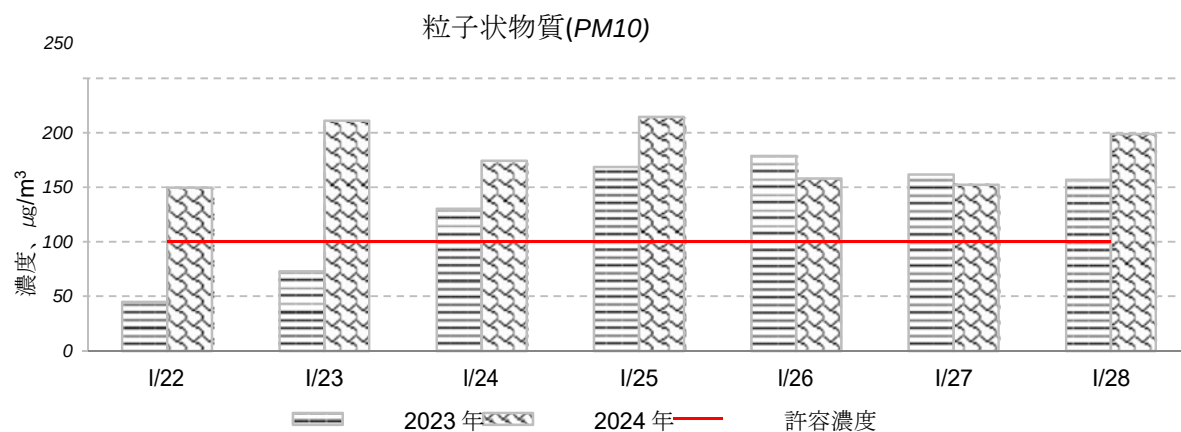
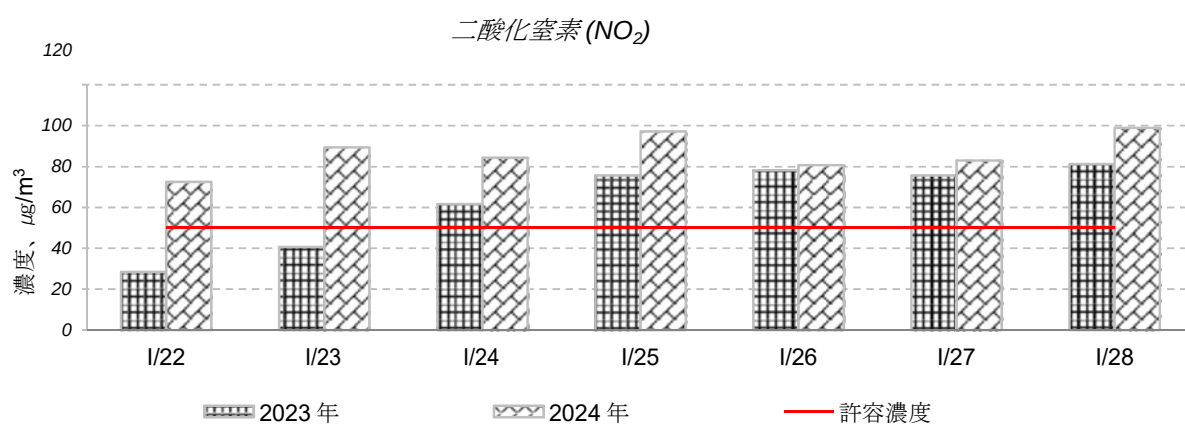
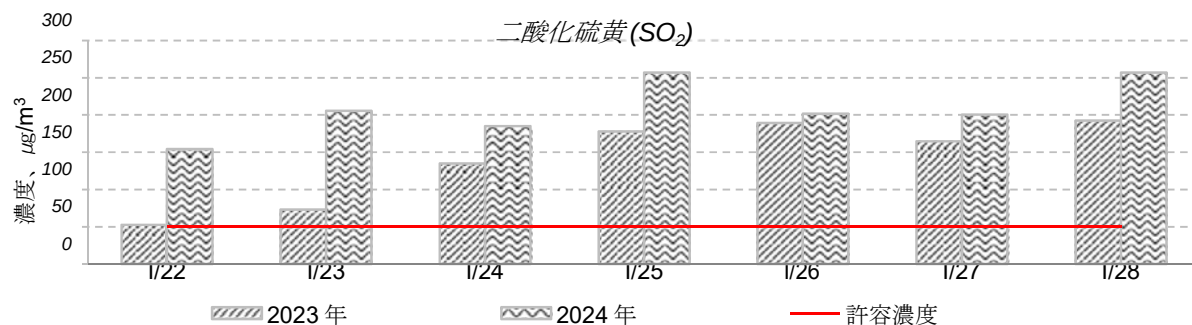
Mongolian regulation “Монгол улсын байгаль орчин, аялал жуулчлалын сайдын тушаал” (A/222, 2028.07.04) requests self-monitoring by power plants, and no way is defined to evaluate the self-monitoring. It is recommended to revise legal environment

to request measurement by third party and to legalize budget allocation.

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ウランバートル市大気環境測定値の過去一週間分
/2024年1月22日～2023年1月28日/

ウランバートル市大気中の主な大気汚染物質は二酸化硫黄/ SO_2 /、二酸化窒素/ NO_2 /、粒子状物質/ PM_{10} 、 $\text{PM}_{2.5}$ /、一酸化炭素/ CO /、オゾン/ O_3 /濃度の測定結果は以下の通りである。



ウランバートル市の過去一週間分の大気質 (2024 年 1 月 22 日～2024 年 1 月 28 日)
/2023 年同期との比較/

№	汚染物質	MNS 4585:2016	週間平均濃度、 μg/m ³		24 時間平均最大濃度、 μg/m ³		基準超過回数、%		基準超過、最大濃度の測定局
		排出許容量 μg/m ³	2023 年	2024 年	2023 年	2024 年	2023 年	2024 年	
1	二酸化硫黄(SO2)	50	143 μg/m ³	210 μg/m ³	409 μg/m ³	706 μg/m ³	82 %	93 %	Bayankhoshuu 周辺では大気環境基準より 14.1 倍高い
2	二酸化窒素 (NO2)	50	63 μg/m ³	86 μg/m ³	181 μg/m ³	183 μg/m ³	63 %	91 %	100 世帯周辺では大気環境基準より 3.6 倍高い
3	粒子状物質 (PM10)	100	131 μg/m ³	183 μg/m ³	401 μg/m ³	465 μg/m ³	58 %	71 %	Tavan buudal 周辺では大気環境基準より 4.6 倍高い
4	微小粒子状物質 (PM2.5)	50	101 μg/m ³	159 μg/m ³	309 μg/m ³	485 μg/m ³	76 %	89 %	Bayankhoshuu 周辺では大気環境基準より 9.7 倍高い
5	一酸化炭素 (CO)	10000	2790 μg/m ³	3472 μg/m ³	16859 μg/m ³	15246 μg/m ³	4 %	6 %	Tolgoit 周辺では大気環境基準より 1.5 倍高い
6	オゾン(O ₃)	100	18 μg/m ³	12 μg/m ³	79 μg/m ³	52 μg/m ³	0 %	0 %	超過ケースなし

ウランバートル市過去一週間分の気象データ、2024 年 1 月 22 日～2024 年 1 月 28 日
/2023 年同期との比較/

№	気象項目	2023 年	2024 年	備考
1	平均気温、°C	-25.3 °C	-22.3 °C	-3.0 °C で高い (暖かい)
2	平均風速、 m/s	1.4 m/s	0.8 m/s	0.6 m/s で低い (遅い)
3	降水量、mm	0.0 mm	0.0 mm	降雪なし

ウランバートル市内の大気質指標情報
/2024 年 1 月 22 日～2024 年 1 月 28 日/

	ゲル地区周辺											住宅地区	幹線道路付近		工業地帯			郊外地区
	第 1 住宅地区	100 世帯	Tolgoit	Nisekh	MNB 局	Damba darjaa	Bayankhoshuu	Khailaast	Tavan buudal	Sharkhad	Nalaikh	第 13 住宅地区	西交差点	Amgalan	火力発電所	Misheel Expo	Zaisan	Urgakh naran
2024.01.22	PM10, NO ₂ , PM2.5, SO ₂	PM10, SO ₂	NO ₂ , SO ₂ , PM2.5	PM2.5, NO ₂	PM10, NO ₂ , SO ₂	PM2.5	PM2.5	PM2.5	PM10	PM10, NO ₂ , SO ₂	PM10	PM10, NO ₂ , SO ₂	PM10, NO ₂ , PM2.5, SO ₂	PM2.5, NO ₂	PM10, SO ₂	SO ₂		SO ₂
2024.01.23	PM2.5	PM10, SO ₂	NO ₂ , SO ₂ , PM2.5	PM2.5, NO ₂	PM10, NO ₂ , SO ₂	PM2.5	PM2.5	PM2.5	PM10	PM2.5	PM10, NO ₂ , SO ₂	PM10, NO ₂ , PM2.5, SO ₂	PM10, NO ₂ , PM2.5, SO ₂	PM2.5, NO ₂	PM10, SO ₂	PM10, SO ₂	PM2.5	PM10, NO ₂ , SO ₂
2024.01.24	PM2.5	PM10, SO ₂	NO ₂ , SO ₂ , PM2.5	PM2.5, NO ₂	PM10, NO ₂ , SO ₂	PM2.5	PM2.5	PM2.5	PM10	PM10	PM10, NO ₂ , SO ₂	PM10, NO ₂ , PM2.5, SO ₂	PM10, NO ₂ , PM2.5, SO ₂	PM2.5, NO ₂	PM10, SO ₂	SO ₂		PM10, NO ₂ , SO ₂
2024.01.25	PM2.5	PM10	NO ₂ , SO ₂ , PM2.5	PM2.5, NO ₂	PM2.5	PM2.5	PM2.5	PM2.5	PM10	PM10, PM2.5	PM10	PM10, NO ₂ , PM2.5, SO ₂	PM10, NO ₂ , PM2.5, SO ₂	PM2.5, NO ₂	PM10, SO ₂	PM10, SO ₂	PM2.5	PM10, NO ₂ , SO ₂
2024.01.26	PM2.5	PM10, SO ₂	NO ₂ , SO ₂ , PM2.5	PM2.5, NO ₂	PM10, NO ₂ , SO ₂	PM2.5	PM2.5	PM2.5	PM10, NO ₂ , SO ₂	PM10, PM2.5	PM10, NO ₂ , SO ₂	NO ₂ , SO ₂	NO ₂ , PM2.5, SO ₂	PM2.5, NO ₂	SO ₂	SO ₂		PM10, SO ₂
2024.01.27	PM2.5	PM10, SO ₂	NO ₂ , SO ₂ , PM2.5	PM2.5, NO ₂	PM10, NO ₂ , SO ₂	PM2.5	PM2.5	PM2.5	PM10, NO ₂ , SO ₂	PM10, PM2.5	PM10, NO ₂ , SO ₂	NO ₂ , SO ₂	PM10, NO ₂ , PM2.5, SO ₂	PM2.5, NO ₂	SO ₂	SO ₂		SO ₂
2024.01.28	PM10, PM2.5	PM10, SO ₂	NO ₂ , SO ₂ , PM2.5	PM2.5, NO ₂	PM2.5	PM2.5	PM2.5	PM2.5	PM10	PM10, PM2.5	PM10, NO ₂ , SO ₂	PM10, NO ₂ , PM2.5, SO ₂	PM10, NO ₂ , PM2.5, SO ₂	PM2.5, NO ₂	PM10, SO ₂	SO ₂		PM10, NO ₂ , SO ₂

大気質指標	大気質区分	健康影響
0 - 50	キレイ	人間の健康にマイナス影響はない。
51-100	普通	大気環境基準を満たしている。しかし、一部の敏感なグループにとっては呼吸器疾患の症状を起こす可能性がある。
101 - 200	弱い汚染	敏感なグループにとってはマイナス影響を起こす。慢性の循環器（心臓脈）・呼吸器疾患を持つ人、特に気管支喘息の人に著しく影響を及ぼす。
201 - 300	中程度の汚染	人間健康に影響を及ぼす。敏感なグループにとっては重大な影響を及ぼす。
301- 400	強い汚染	長期間にわたって外出の場合、人間健康に著しい影響を与える。
401-500	非常に強い汚染	人間の健康にマイナス影響がある。

2024 年 1 月 22 日～1 月 28 日間の過去一週間大気環境モニタリング結果によると、ウランバートル市内の大気質は Zaisan, Tolgoit, Nisekh, 第 13 住宅地区、西交差点、Amgalan, Urgakh naran 住宅地区、Misheel Expo, 火力発電所周辺では『弱い汚染』、Nalaikh, 100 世帯、MNB 局、Sharkhad 周辺では『中程度の汚染』、第 1 住宅地区、Dambadarjaa, Tavan buudal 周辺では『強い汚染』、Khailaast, Bayankhoshuu 周辺では『非常に強い汚染』のレベルに達するケースがあった。

NAMEM 環境分析課

ウランバートル市
大気汚染対策能力強化プロジェクト
フェーズ3
第1回本邦研修
研修報告

2022/11/22

独立行政法人 国際協力機構

研修概要

1. 期間 2022/11/9 ~ 2022/11/23
2. 研修員

Nominee	Position	Organization
Tumurbaatar Tudevdagva	Director of CLEM	CLEM
Baldorj Barkhasragchaa	Head of Environmental monitoring laboratory	CLEM
Dashdendev Tumendelger	Engineer	CLEM
Erdenebat Oyuntuya	Engineer	CLEM
Dorjsuren Suvd	Technician	CLEM
Bud-Ochir Batkhishig	Technician	CLEM
Sarangerel Enkhmaa	NAMEM	NAMEM
Enkhbayar Amarzaya	NAMEM	NAMEM

4. 本研修の概要

・ 研修先

大阪公立大学	PM成分分析実習
大阪府立環境農林水産総合研究所	PM成分分析の実例紹介、精度管理の留意点
数理計画	PM発生源寄与解析（レセプタモデルの概要・実習）

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4. 本研修の概要

日付	時間	研修内容	場所
11/11	10:00-11:00	本邦研修の目的、スケジュール	JICA関西
	11:10-12:10	PM発生源寄与解析の基礎	JICA関西
	13:30-16:30	レセプタモデル実習	JICA関西
11/14	10:00-16:30	PM成分分析の概要説明 PM成分分析実習	大阪公立大
11/15	10:00-12:00	PM成分分析実習	大阪公立大
	14:00-16:30	分析設備の見学/PM成分分析の実例紹介、精度管理の留意点	大阪府立環境農林水産総合研究所
11/16	10:00-16:30	PM成分分析実習	大阪公立大
11/17			
11/18			
11/21	10:00-16:30	PM成分分析実習のまとめ 機材整備計画作成	JICA関西
11/22	09:00-16:00	研修報告会・評価会 閉講式	JICA関西

5. 研修の課題

1. ウランバートルでPM発生源寄与解析を行うために必要な機材整備計画を作成する。
 - ウランバートルにおいて、これまで2021年11月から2022年11月まで、UB市内でPM採取作業を行ってきた。
 - しかし、CLEMは炭素分析計等の必要な機材を所有していなかったため、成分分析は日本で再委託によって行っている。
 - 将来的にCLEMでPM成分分析を行うことができるよう、各機材の運用上の特徴、導入にかかるイニシャルコスト、消耗品・試薬等に係るランニングコスト等を学び、それらを踏まえてNAMEMとCLEMがPM成分分析機材の整備計画を策定することを課題とした。

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研修成果

・ 成分分析の実習 - フィルタの秤量・調製

日本

成分分析の実習を通して理解が深まった点、気づいた点など

- 温度 (21,5°C), 湿度 (30-40%) 及び環境(室内)状況が重要
- フィルターの保存
- フィルター上の静電気を中和する / 帯電除去/
- フィルターを2秒毎に12回秤量する
- 専用のハサミが必要
- フィルターの品質管理
- フィルターを900°Cのマッフル炉で焼いて不純物を除去する

自国で実施するための課題

- 経費 (脱イオン機器の部品、ヒーター購入のための費用を調べること、Advantec Distilator)
- フィルターを正確に半分に切断するためのハサミ、カッター、試料ポート



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・ 成分分析の実習 - イオン分析

日本

成分分析の実習を通して理解が深まった点、気づいた点など
試料の前処理のための環境整備を注意する
-マスク、手袋及び清潔な環境維持に心がける
-蒸留水の純度が重要
-新しいブランクフィルターを毎回、計量すること
-超音波処理槽の水温度をよく注意する



モンゴル

自国で実施するための課題

ラボラトリー長が超音波処理槽の購入を決定した。
-標準溶液、部品・消耗品の在庫がない（標準溶液、ピペット）。
-韓国の有償では機材がメインで部品・消耗品は供与されない課題がある。将来的に購入しなければならないが予算なし。



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・ 成分分析の実習 - 元素分析

日本

成分分析の実習を通して理解が深まった点、気づいた点など
ターゲット別の結果を比較して、結果を分析する



モンゴル

自国で実施するための課題

必要な年間経費解決のために、上部レベルに
分析結果を紹介・報告して、理解を促す
-分析実施に係る人材の能力向上
-結果を正しく整理・処理し分析する能力を身につける
-測定の不確実性を計算する方法がまだ十分理解できなかった
-最も大きな課題は資金



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・ 成分分析の実習 - 炭素分析

日本

成分分析の実習を通して理解が深まった点、気づいた点など

成分分析の実施に多種のガスが使用される。

- 分析結果を正確に読み取ることができるようになることが必要。
- OCとECの違いが分かった。
- 分析機材を用いて、6回測定を行った。



モンゴル

自国で実施するための課題

- ガス及び基準ガスの入手が困難
(5つのガスが使用される)
- 資金



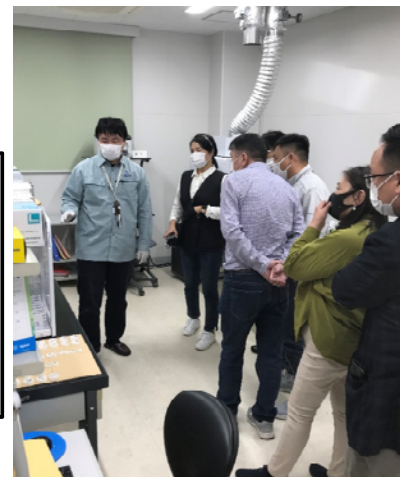
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・ ラボの運営・分析品質管理

日本

理解が深まった点、気づいた点など

フィルターの前処理、保管、天秤の精度、測定頻度、機器の整備・安定、試料の前処理の注意事項、整備環境の影響、分析結果の保存、標準作業手順書の利用、標準液・試薬の汚染防止、精度



モンゴル

将来的に供与される予定のラボを管理・運用することも踏まえ、課題や参考にできる点など
ラボラトリー分析業務の費用が高いため、資金が必要。ラボ分析のための資金が確保されていない。

- ガイドライン、プログラムの改善、その徹底実施を図る
- 日本の場合は、分析結果に基づいて対策を計画している。
- 法的環境に基づいて業務実施ができている。分析結果が重要であることが理解できた。

・発生源寄与解析の事例

日本

発生源寄与解析の事例を通して理解が深まった点、気づいた点など

- 発生源インベントリ作成が不要、成分結果に基づいて発生源寄与を特定する
- 成分結果に基づいて発生源に対する適切な汚染対策を実施する
- 結果を比較して、測定のエラーがわかる、サンプル数が重要



モンゴル

自国で実施するための課題

多種の分析結果に基づいて発生源寄与を特定するため分析機器、機材が不足
-機器・機材利用の場合、必要な年間経費が高額になるため、毎年資金の確保が必要である。現在、分析経費のための資金がない。

・レセプタモデルの実習

習得できた点

理解が深まった点、気づいた点など
因子の選定、発生源の区別、モデル上の補正、
多種のモデルがある等の基本的な理解ができた



更に実習・講義が必要な点

研修後の渡航でフォローアップが必要な点

発生源の区別、因子の選定、測定の不確実性、計算の実施、モデル入力データの作成等を詳細に学習する

炭素分析

分析機材候補	Magee scientific (DRI 2015)
必要な分析項目	OC and EC
分析法	Thermal optical reflectance method (TOR)
望ましい条件	IMPROVE-A procedure
特記すべき消耗品	Support Gases: ▪ Ultra-high purity (UHP) helium (hydrocarbon free, >99.999% purity) ▪ 10% oxygen in UHP helium ▪ 5% methane in UHP helium ▪ Compressed air
コスト	機材-200,000 USD, 年間必要な経費-10,000USD
課題	新しいラボラトリーができると機器・機材の購入が行われる。経費がとても重要で、人材能力の強化

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イオン分析

分析機材候補	Dionex IC Metrohm IC
必要な分析項目	Water-soluble ionic species as anion (NO_3^- , SO_4^{2-} , CO_3^{2-} and Cl^-) and cation (NH_4^+ , Na^+ , K^+ and Ca_2^+)
分析法	Ion Chromatograph
望ましい条件	
特記すべき消耗品	Anion, cation guard column, 自動サンプラー
コスト	100,000 USD、年間経費5000 USD
課題	-蒸留水機器の解決 -超音波処理槽の購入が決定(T. Tudevdayva所長が資金を解決した)

元素分析

分析機材候補	Panalytical Zetium
必要な分析項目	Na, Mg, Al, Si, P, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, As, Se, Br, Rb, Sr, Mo, Sn, Sb, Ba, Pb etc.
分析法	X-ray fluorescence spectroscopy (EDXRF)
望ましい条件	特別の施設
特記すべき消耗品	Support Gas: ▪ liquid nitrogen
コスト	300,000 USD 10,000USD (5年に一回ランプ交換と仮定)
課題	年間経費 -人材能力 -結果の整理・とりまとめ

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元素分析 3

分析機材候補	Agilent : 5110 ICP-OES Thermo Fisher : icap 7400
必要な分析項目	Na, Mg, Al, Si, P, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, As, Se, Br, Rb, Sr, Mo, Sn, Sb, Ba, Pb etc.
分析法	ICP-OES
望ましい条件	
特記すべき消耗品	Support Gas: ▪ Argon (>99.99)
コスト	220,000 USD、年間経費 25,000 USD
課題	年間経費 -人材能力 -結果の整理・とりまとめ

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課題

自国で機材整備を進めるにあたり課題となる点を整理する。

➤ 法・制度上の課題

- 法律の実施を改善して、達成状況を監査して、毎年、結果を協議する
- 計画に業務結果を確認する
- 自動サンプラーの場合、夜間勤務が可能である。
- 組織体制を更新する
- 分析業務が重要という理解に基づいて機材装置の課題を解決する

➤ 人員上の課題

- 人材確保、その能力、定員数増加、給与（韓国から70名に増員する必要があると提案されている。）
- 運用マネジメントの更新、ラボラトリーの分析結果が汚染削減対策の計画に重要な資料となるため、ラボラトリーの業務活動の支援、資金を別に計画すること、経費確保のための融資

提案・要望：プロジェクト成果を上部レベルの幹部役に紹介・報告して、成果活用の理解、効果的な正しい汚染対策の策定に影響する（環境大臣、Amarbaysgalan大気汚染低減委員会委員長・委員(副大臣)、UB市長、国会議員、など上部レベルの管理役対象とした協議会の実施を計画する）

Thank you for your cooperation



排出インベントリの作成について

2020/9/10

JICA専門家チーム 仲田 伸也

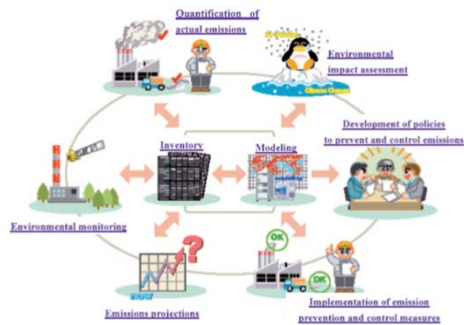
1

目次

- プロジェクトにおける排出インベントリの役割
- 排出インベントリの基本方針
- 2018年データの確認
- 今後のインベントリ作成の進め方

2

排出インベントリの役割



Source: What is an Emission Inventory?
<https://www.acap.asia/en/publications-acap/>

3

排出インベントリとは?

- ある期間内に大気汚染物質がどこからどのくらい排出されたのかを示す目録
- 排出インベントリの利用目的
 - 排出実態の定量的把握
 - シミュレーションモデルへのインプットとその活用
 - 将来予測と大気汚染対策の策定
 - 対策技術の検討への活用

4

排出インベントリの基本方針 (1)

- 基本的な計算方法

$$\text{排出量} = \text{活動量} \times \text{排出係数}$$

- 活動量: 排出をもたらす活動の大きさ
- 排出係数: 単位活動量当たりの汚染物質平均排出量
- いずれの値も、モンゴルで入手可能なデータを最優先で使用

5

排出インベントリの基本方針 (2)

- 対象発生源
 - 燃料消費
 - 固定発生源、移動発生源
 - 工業プロセス
 - 炭鉱での採掘
 - GSからの漏出
 - 溶剤使用
 - 農業活動
 - 森林及び草原火災
 - 固形廃棄物処理
- 対象汚染物質
 - SO₂
 - NO_x
 - TSP
 - PM₁₀
 - PM_{2.5}
 - CO
 - NH₃
 - NMVOC

6

排出インベントリの基本方針 (3)

- 時間変化
 - 固定発生源: 燃焼施設の稼働状況
 - 移動発生源: 自動車の交通量、航空機鉄道の便数
 - 工業プロセス: 施設の操業時間
 - 炭鉱での採掘: 操業時間
 - 森林火災: 火災の発生時間、消火時間
 - 廃棄物処理: 施設の稼働時間
 - データが得られない場合は、一定の稼働パターンとする。

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排出インベントリの基本方針 (4)

- 空間分布
 - 個別調査による位置情報
 - GISデータによる道路網、路線網
 - 延焼面積
 - 精度の高い順に、緯度経度、村・ホローレベル、郡・区レベル、県・市レベル、国全体

8

2018年インベントリの 作成のためのデータ確認

9

火力発電所

- 石炭使用量
 - 月別ボイラ別の使用量
- 煙突諸元
 - 一部データが変わっていたが
- 時間変化パターン
 - 月別変化は石炭使用量から計算可能
 - 日別あるいは時刻別変化は発電所の発電量と熱供給量から推計
- その他
 - 硫黄分及び灰分、排ガス処理装置の除去率

10

HOB (Heat Only Boiler)

- 石炭使用量の値に疑問点あり
 - 年間1000トン以上のボイラがある→単位ミス？
 - 1つの施設での合計使用量がすべてのボイラで記載されている可能性がある
- 煙突諸元に関する情報がない
 - 高さ、形状、口径あるいは縦横長
- 位置情報
 - 緯度経度や所在地がブランク
 - 緯度経度が逆に入力
 - 緯度経度の表記方法が統一されていない
- 必要な情報の追加、かつ、データのクリーニングの必要性

11

CFWH (Coal Fired Warm Heater)

- 個別データ
 - 石炭使用量の値に疑問点あり
 - 年間1000トン以上のボイラがある→単位ミス？
 - 緯度経度の入力
 - 緯度経度が逆
 - 表記方法が統一されていない
- 今後個別データを活用するのであれば、必要な情報の追加、かつ、データのクリーニングの必要性

12

家庭用小型ストーブ

- 個別データ
 - 石炭使用量の値に疑問点あり
 - 年間1000トン以上のボイラがある→単位ミス？
 - 緯度経度の入力
 - 緯度経度が逆
 - 表記方法が統一されていない
- ホロー別ストーブ種類別台数の情報
 - 2017年及び2019年と同様の書式で作成
- 今後個別データを活用するのであれば、必要な情報の追加、かつ、データのクリーニングの必要性

13

自動車

- 車検登録データベース→OK
 - 車体重量の単位変換
- UB市税関燃料輸入量→OK
- 道路網GISデータ
 - 道路、オーバークスの建設による道路の変化を把握
- 排出原単位の更新
 - 日本の排出原単位の確認
- 交通量調査を2019年9月と12月に実施
 - 2019年のインベントリに反映予定

14

その他

- 道路粉塵
 - 路上のシルト率
- 焼却灰の巻き上げ
 - 灰捨て場の利用状況
 - 飛散可能面積
- 野焼き
- 航空機
- 廃棄物処分場（Landfill）
- 工場（燃焼、工業プロセス、溶剤利用）

15

今後の予定

- 排出量計算に慣れる
 - 発電所のデータを使って計算
- データの追加収集
 - 最新の道路網のGISデータ
- 11月をめぐにすべての発生源の排出量を計算
- 12月以降
 - 気象データの整理
 - 大気質測定局データの整理
 - シミュレーションの実行

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2020年発生源排出量計算 結果報告

2022/3/17

DAAP

JICA専門家チーム（仲田）

1

目次

- 目的
- 排出量計算結果概要
- 各発生源排出量計算手順
- まとめ
- 今後の課題

2

目的

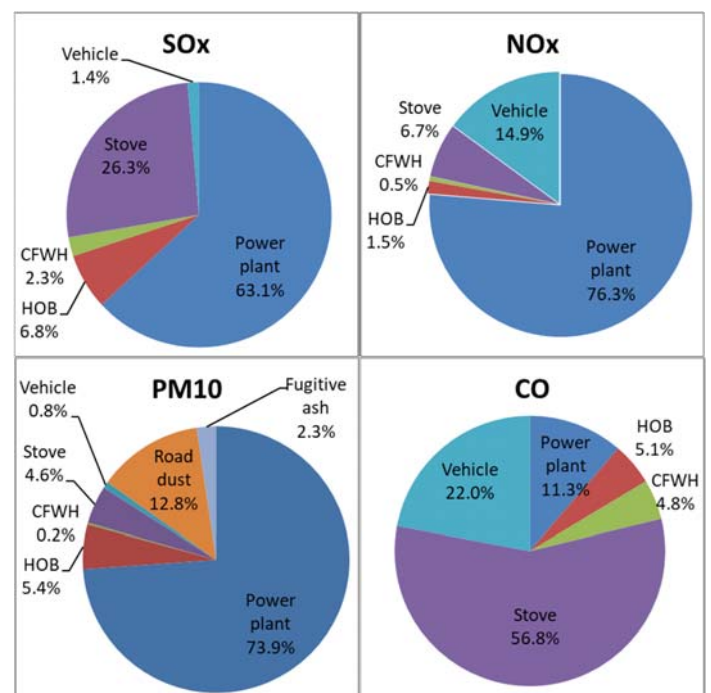
- 以下の目的に基づき、**2020年**の排出インベントリを作成する。
 - 改良燃料使用前である**2018年**の排出量と比較することで、改良燃料使用による排出量削減効果を確認する。
 - 大気汚染構造把握のための拡散シミュレーションモデルの入力データとして活用する。
 - 大気汚染対策案を評価する。

3

排出量計算結果

	SOx	NOx	TSP	PM10	CO
火力発電所	13,544.3	18,113.8	24,513.6	22,447.1	10,415.2
HOB	1,462.2	366.5	1,720.6	1,634.6	4,676.0
CFWH	498.1	126.0	73.3	63.2	4,413.7
家庭用小型ストーブ	5,648.5	1,582.8	1,510.1	1,394.2	52,239.4
自動車	298.4	3,545.8	243.6	243.6	20,287.0
道路粉塵			3,892.4	3,892.4	
発電所灰飛散			1,859.0	712.4	
合計	21,451.5	23,734.9	33,812.7	30,387.5	92,060.9

単位: ton/year



4

発生源	活動量	排出係数	その他の情報
火力発電所	発電所別月別石炭使用量	第2、第3、第4火力：プロジェクトでの排ガス測定結果に基づいた排出係数 Amgalan：建設時の排ガス濃度の仕様に基づいて計算	煙突情報（位置座標、高さ、口径、排ガス速度）
HOB	発生源登録データ	プロジェクトでの排ガス測定結果に基づいたボイラ別排出係数	煙突情報（位置座標、高さ、口径、排ガス速度）
CFWH	発生源登録データ	プロジェクトでの排ガス測定結果に基づいたCFWHの排出係数	居住範囲面積
家庭用小型ストーブ	発生源登録データ	プロジェクトでの排ガス測定結果に基づいたストーブ別燃料種類別排出係数	居住範囲面積
自動車（道路粉塵含む）	道路交通網データ 2019年に実施した交通量調査データ	日本の排ガス規制年別排出原単位 2019年に実施した旅行速度調査 走行巻き上げの排出係数（AP-42）	
発電所灰飛散	灰埋め立て地面積	灰埋め立て地の浸食深さ調査結果	

5

火力発電所排出量算定

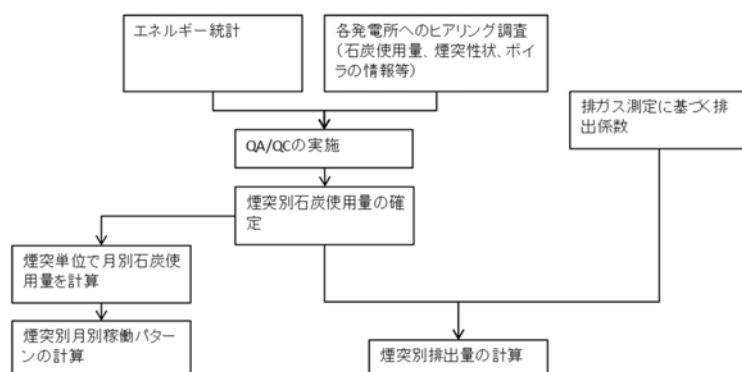
$$E = \sum_i^N (AD_i \times EF_i \times 1000)$$

E: 排出量 (ton/year)

Adi: 煙突”i”が接続されたボイラの石炭年間使用量 (ton/year)

EFi: 煙突”i”の排出係数 (kg/ton燃料)

N: 煙突の本数

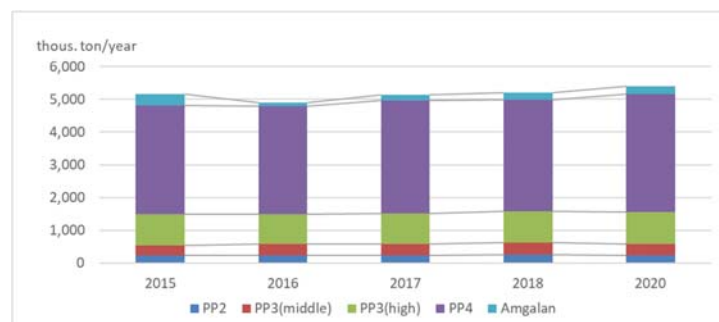


6

発電所別月別石炭使用量

	2015	2016	2017	2018	2020
第2火力	225.4	236.7	241.5	261.6	228.9
第3火力 (中圧)	322.8	339.6	331.7	353.9	356.2
第3火力 (高圧)	954.9	927.8	943.9	971.3	984.1
第4火力	3,305.4	3,286.5	3,451.2	3,397.8	3,583.1
Amgalan	351.5	109.7	159.0	225.4	250.2
合計	5,159.9	4,900.4	5,127.3	5,209.9	5,402.5

単位: 千ton/year



活動量は、各発電所から提供された月別石炭使用量である。
若干の増加はあるものの、大きな変動はない。

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排出係数

	SO2	NOx	TSP	PM10	CO
第2火力	3.31	0.97	23.37	21.40	41.35
第3火力 (中圧)	7.35	6.91	10.47	9.59	1.13
第3火力 (高圧)	1.64	0.88	5.13	4.69	0.23
第4火力	2.19	3.87	2.87	2.63	0.03
Amgalan	2.87	2.87	0.36	0.33	0.91

単位: kg/ton

第2、第3、第4火力: プロジェクトで排ガス測定結果に基づいた排出係数

Amgalan: 建設時の排ガス濃度の仕様に基づいて計算

8

HOB排出量算定

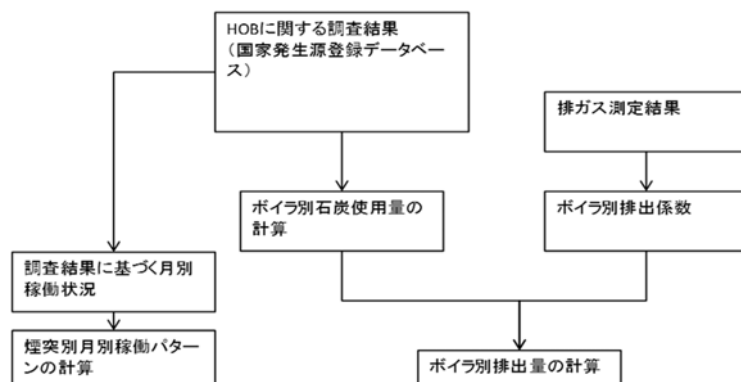
$$E = \sum_i^N (AD_i \times EF_i \times 1000)$$

E: 排出量 (ton/year)

AD_i: 煙突”i”に接続されたボイラの石炭年間使用量 (ton/year)

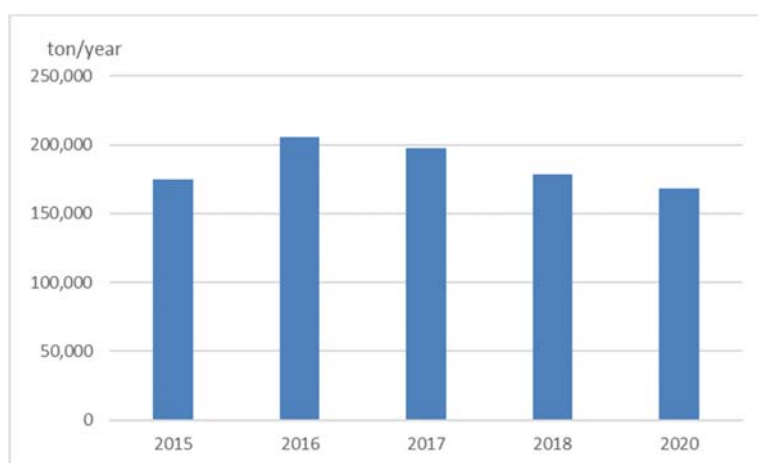
EF_i: 煙突”i”の排出係数 (kg/ton)

N: 煙突の本数



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HOB燃料使用量



2015	2016	2017	2018	2020
175,059	205,717	197,472	178,503	168,249

単位: ton/year

発生源登録データをボイラ登録HOBの燃料は、生石炭およびミドリングブリケットである。

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ボイラ別排出係数（一部）

Boiler TypeID	Boiler Type	Coal Type	SO2_EF	NOx_EF	TSP_EF	PM10_EF	CO_EF
1	HP	Baganuur	4.75	1.27	16.79	15.95	20.59
3	HP	Others	7.81	1.22	10.45	9.93	24.23
7	MUHT	Baganuur	11.80	3.67	11.06	10.51	19.90
7	MUHT	Baganuur	11.80	3.67	11.06	10.51	20.90
10	KCR	Baganuur	0.94	0.23	4.86	4.62	14.08
13	DZL	All	12.01	3.35	5.58	5.30	20.52
13	DZL	All	12.01	3.35	5.58	5.30	20.52
14	Carborobot	All	10.54	1.19	8.87	8.43	54.78
15	Eco Eco	Baganuur	4.28	0.77	1.16	1.10	32.88
18	CLSG	All	7.77	0.50	13.28	12.61	45.43
19	Viaduras	All	4.70	0.69	2.64	2.51	109.82
21	DZH	Baganuur	0.74	0.10	7.60	7.22	11.96
25	EcoEffect	All	14.78	1.10	2.59	2.46	51.42
27	LSG	All	28.57	4.91	7.60	7.22	65.10
28	CLHG	All	16.15	4.80	8.04	7.64	274.68
29	BZUI	All	3.77	1.07	10.64	10.11	32.08
30	Euro Zigi Star-kom	All	6.74	2.26	63.76	60.57	48.18
31	Odcon	All	0.61	0.06	1.29	1.22	4.10
33	Others	Baganuur	3.97	1.17	9.85	9.36	30.59
42	KBPO7KB	All	6.31	0.68	32.13	30.52	26.35

HOBのミドリングブリケットでの排ガス測定結果はないため、これまでの排ガス測定結果に基づいたボイラ別排出係数を適用している

単位: kg/ton

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CFWH排出量算定

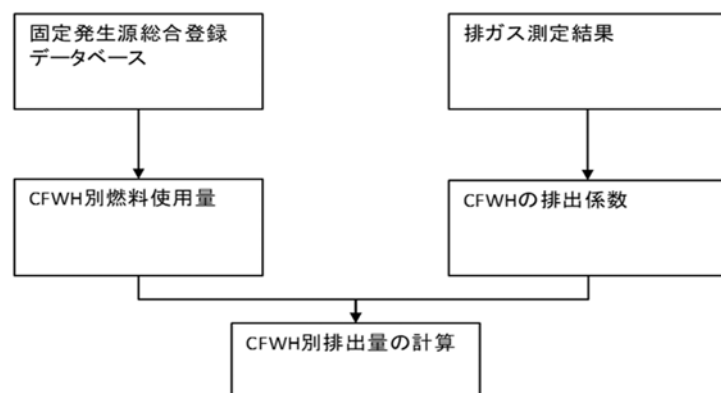
$$E = \sum_i^N (AD_i \times EF \times 1000)$$

E: 排出量 (ton/year)

AD_i: ホロー”i”での年間石炭使用量 (ton/year)

EF: 排出係数 (kg/ton)

N: ホロー数

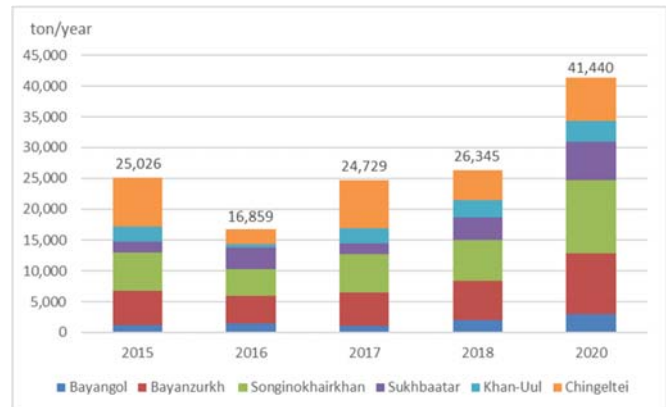


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CFWH燃料使用量

	2015	2016	2017	2018	2020
Bayangol	1,158	1,443	1,104	2,065	2,930
Bayanzurkh	5,676	4,519	5,460	6,336	9,980
Songinokhairkhan	6,225	4,402	6,225	6,606	11,803
Sukhbaatar	1,773	3,420	1,773	3,685	6,271
Khan-Uul	2,417	639	2,407	2,772	3,324
Chingeltei	7,778	2,437	7,760	4,881	7,132
Total	25,026	16,859	24,729	26,345	41,440

単位: ton/year



CFWHの燃料は、改良燃料である。

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排出係数

SO2	NOx	TSP	PM10	CO
12.02	3.04	1.77	1.53	106.51

単位: kg/ton

CFWHの改良燃料使用における排ガス測定は行われていないので、TTT社が実施した改良型ストーブでの燃焼試験結果に基づく排出係数を適用している。

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家庭用小型ストーブ排出量算定

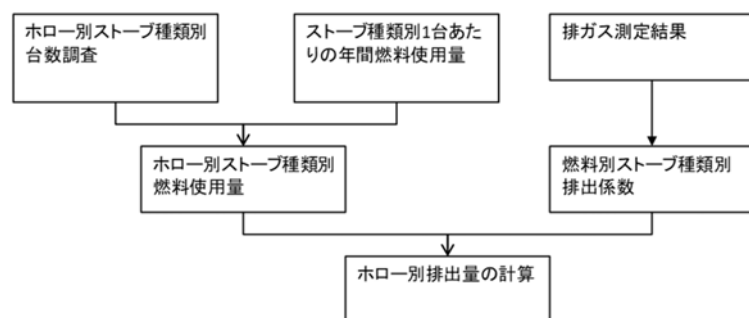
$$E = \sum_{i=1}^N \sum_{k=1}^3 \sum_{j=1}^2 (AD_{i,j,k} \times EF_{j,k} \times 1000)$$

E: 排出量 (ton/year)

AD_{i,j,k}: ホロー“i”の燃料“j”のストーブ“k”の年間燃料使用量 (ton/year)

EF_{j,k}: 燃料“j”ストーブ“k”の排出係数 (kg/ton fuel)

N: ホロー数



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家庭用小型ストーブ燃料使用量

		2015	2016	2017	2018	2020
Ger Stove	Improved Fuel	17,686	167,616	254,439	202,680	131,999
	Wood	2,234	21,168	32,133	25,596	34,273
Wall Stove	Improved Fuel	390,542	173,475	167,890	120,240	146,151
	Wood	39,538	17,563	16,997	12,173	43,212
Improved Stove	Improved Fuel	560,223	374,102	349,495	153,702	178,637
	Wood	79,494	53,084	49,592	21,810	51,964
Total	Improved Fuel	968,451	715,194	771,824	476,622	456,787
	Wood	121,266	91,815	98,722	59,579	129,450

単位: ton/year

* 2018年までは生石炭、2020年は改良燃料



家庭用小型ストーブの燃料は、改良燃料および木材である。

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排出係数

Fuel Type	Stove Type	TSP	PM10	SOx	NOx	CO
Improved Fuel	All	1.77	1.59	12.02	3.04	106.51
Wood	All	5.42	5.15	1.22	1.50	27.71
Coal	Ger Stove	6.23	5.61	3.32	1.15	62.71
	Wall Stove	9.77	8.79	3.32	0.61	60.37
	Improved Stove	1.23	1.10	3.32	0.93	21.29

単位: kg/ton

改良燃料について、TTT社が実施した燃焼試験では、改良型ストーブのみが使われているため、排出係数はすべてのストーブで一律の排出係数を適用している。
木材使用における排出係数は、これまでの排ガス測定結果に基づいた排出係数を適用している。

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自動車排出量算定

$$E_i = \sum_{t=1}^{N_t} \sum_{L=1}^{N_L} \sum_{VT=1}^{N_{VT}} EF_{VTi}(V_{Lt}) \cdot tv_{VT,L,t}$$

E_i: 大気汚染物質”i”の年間排出量、(ton)

T: 毎時

N_t: 1年間の時間数 (閏年は366 x 24=8,784 時間、平年は 365 x 24 = 8,760時間)

L: リンク

N_L: リンク数

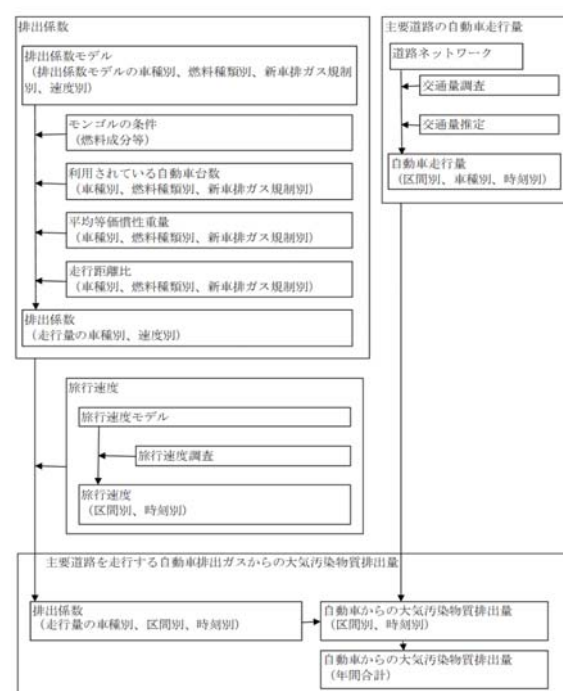
VT: 車種

N_{VT}: 車種数

EF_{VTi}: 車種毎汚染物質毎の排出係数

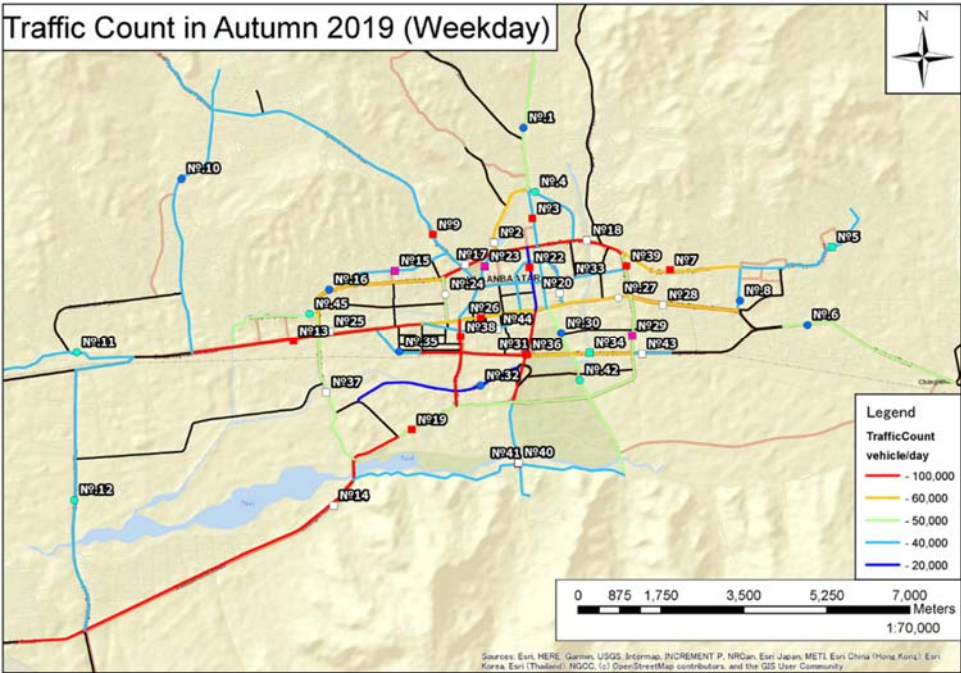
V_{Lt}: 時刻別リンク別旅行速度

tv_{VT,L,t}: 時刻別リンク別車種別走行量



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交通量調査による非冬季平日の地点別交通量



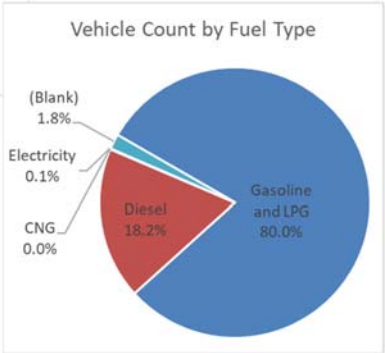
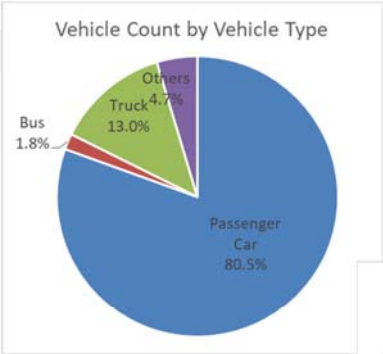
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車種別車検登録台数および車種構成

	2015	2016	2017	2018	2020
車検登録台数	294,902	321,959	345,278	401,725	395,709

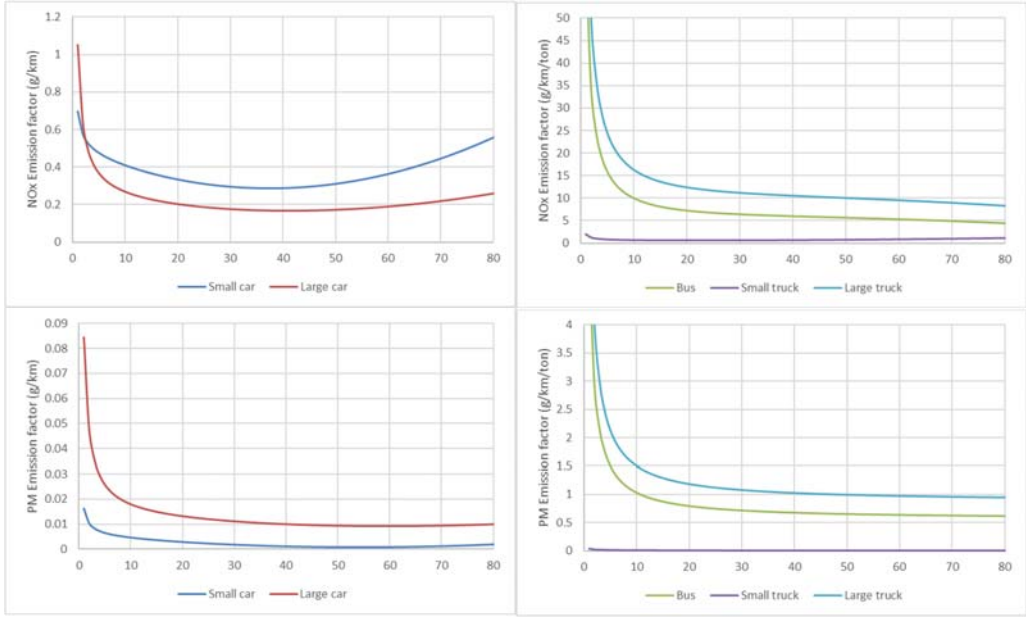
単位: 台
 出典: 国家交通センター

車検登録台数は若干減少している。
 乗用車が80%、トラックが10%以上である。
 ガソリン車が80%、ディーゼル車が18%である。



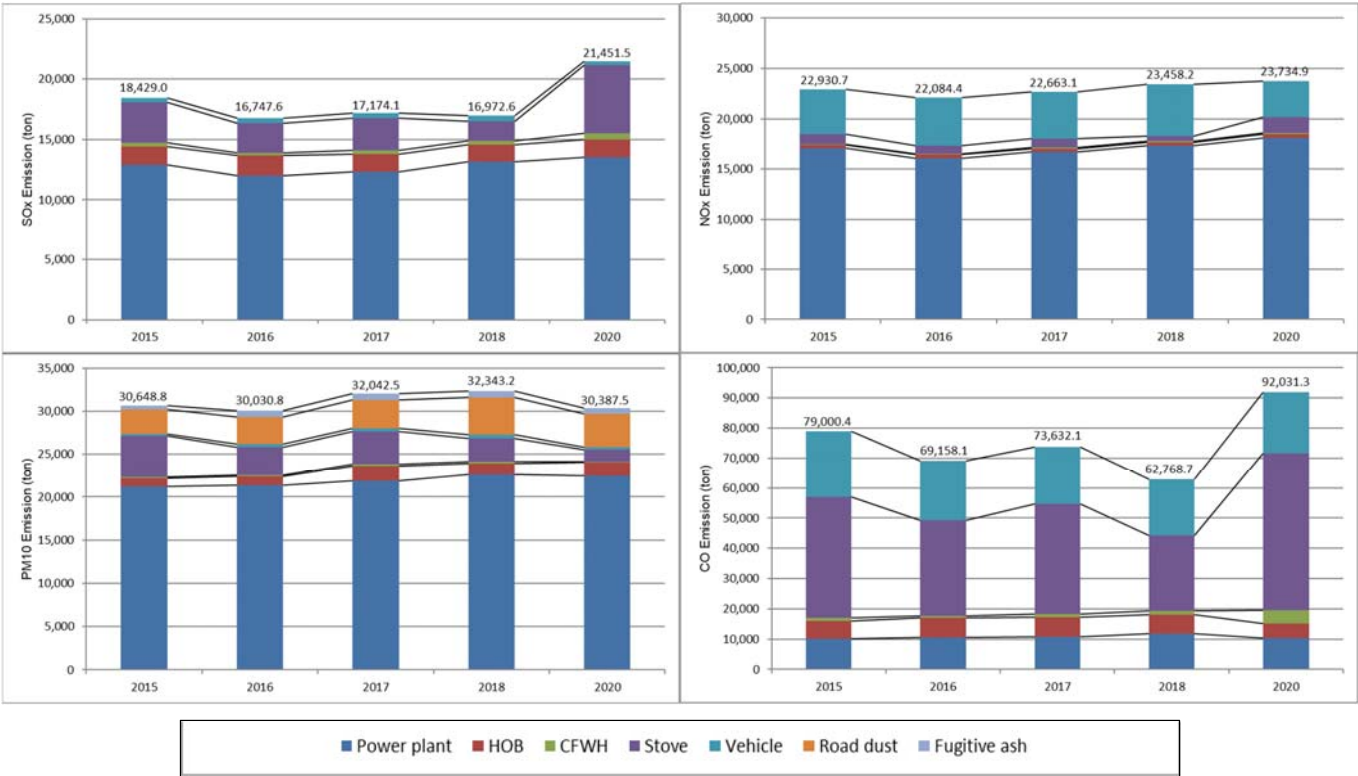
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排出係数



日本車が75%以上を占めているため、日本の排ガス規制基準を基に、モンゴルの状況を加味して車種別旅行速度別排出係数を計算した。

排出量推移



まとめ

- 2020年の発生源別排出量を算定した。
 - 改良燃料に変換されたことによりTSPとPM10の排出量は減少し、SOx、NOx、COの排出量は増加している。
- この排出量算定結果を使って、2020年の大気拡散シミュレーションを実施する。
 - 大気汚染構造の把握
 - 改良燃料への変換に伴う濃度低減効果の検証

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今後インベントリ更新の課題

- 発生源登録データの精度向上、データクリーニング
 - 燃料使用量、位置情報、排出情報
- 排出係数の精度向上
 - HOBのミドリングブリケット使用による排出係数の作成
 - CFWHの改良燃料使用による排出係数の作成
 - 家庭用ストーブの改良燃料使用による排出係数の作成
- 車載計を用いた自動車排出ガス測定による排出係数の精度向上
- 道路変更に伴う交通量調査の再実施

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その他発生源の調査 (活動2-2-4)

2023/3/7
JICA専門家チーム

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1. はじめに
2. 目的
3. 廃棄物処分場
4. レンガ工場
5. 火力発電所の灰埋め立て地からの灰の飛散
6. 主要な発生源の排出量との比較
7. まとめ
8. プロジェクト終了後の課題

2

1. はじめに (1)

1. プロジェクトのPDMで以下の活動がある。

2-2-4 DAAEPとNAMEMがJICA専門家の支援のもと、必要に応じてその他発生源調査を実施する。

2. その他発生源とは、火力発電所、HOB、CFWH、家庭用小型ストーブ、自動車以外の発生源のことである。

3

1. はじめに (2)

1. フェーズ2では、発電所灰埋め立て地からの灰の飛散、廃棄物処分場、レンガ工場を対象としていた。
2. 発電所灰埋め立て地からの灰の飛散及びレンガ工場については、フェーズ2で排出量の算定方法を説明したが、当時の担当者の多くが異動しているため、再度説明する。
3. 今後はモンゴル側でデータを収集し、排出量を計算する。

4

2. 目的

1. その他発生源として、発電所灰埋め立て地からの灰の飛散、廃棄物処分場、レンガ工場の排出量を計算する。
2. 冬季の大気汚染が問題となっているUB市において、計算した排出量から、これらの発生源が冬季の大気汚染に影響を与えるのかを検証する。

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3. 廃棄物処分場

6

3.1. 概要

1. 固形廃棄物処分場への廃棄物処理による大気汚染物質の排出を対象とした。モンゴルでのEmission Inventory Manualでの排出量算定手法を用いて排出量を計算した。



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3.2. 排出量計算方法

1. 廃棄物処分における大気汚染物質の排出量算定方法は以下のとおりである。

$$\text{Emissions} = \sum \text{AD} \times \text{EF}$$

Emissions: 大気汚染物質の排出量 (g/year)

AD: 固形廃棄物の埋め立てに係る活動量 (ton/year)

EF: 固形廃棄物の埋め立てに係る排出係数 (g/ton)

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3.3. 活動量

- 1. 活動量は居住人口から推計した都市ごみ量である。
- 2. UB市のホロー別居住人口に、1人当たりの都市ごみ年間排出量は1.12kg/人/日（408.82kg/人/年）^{*1}とすべての都市ごみのうち、処分場に廃棄される割合（65%）^{*2}を乗じて計算した。

	単位	2018	2019	2020	2021
居住人口	人	1,444,669	1,466,125	1,499,140	1,539,252
推計都市ごみ量	ton/year	590,610	599,381	612,878	629,277

^{*1} Bolorchimeg Byamba and Mamoru Ishikawa (2017): Municipal Solid Waste Management in Ulaanbaatar, Mongolia: Systems Analysis, Sustainability 2017, 9, 896
^{*2} Third National Communication of Mongolia, MET, 2018

3.4. 詳細な活動量データの収集

- 1. UB市廃棄物管理局には、処分場別廃棄物処理量（年間、月間）の情報があある。そのデータを収集し、活動量として排出量を計算することで、精度の高い排出量を算定できるので、算定してみてほしい。

3.5. 排出係数

- 1. EMEP/EEA GuidebookのTier1の値を用いる。これらの値は、欧州の排出係数を使っており、気象条件や廃棄物中の水分量に依存する。

サブカテゴリー	単位	TSP	PM ₁₀	PM _{2.5}
埋め立て処分場	g/ton	0.463	0.219	0.033

3.6. 排出量の計算

- 1. UB市における廃棄物処分場での大気汚染物質排出量は以下のとおりである。

年	TSP	PM ₁₀	PM _{2.5}
2018	0.273	0.129	0.019
2019	0.278	0.131	0.020
2020	0.284	0.134	0.020
2021	0.291	0.138	0.021

単位: ton/year

3.7. 排出量の按分

- 1. 人口比に応じて排出量を3つの処分場に按分し、排出量を割り当てた。



処分場別の2020年の排出量

Disposal Site	集積対象区	TSP	PM ₁₀	PM _{2.5}
ナラギーンエンゲル	Songinokhirkhan, Chingeltei, Sukhbaatar, Nalaikh, Bayangol	0.171	0.081	0.012
ツァガンダワー	Bayanzurkh	0.070	0.033	0.005
モリンギーンダワー	Khan-Uul	0.037	0.018	0.003

単位: ton/year

4. レンガ工場

4.1. 概要

- 1. レンガ工場でのレンガ製造プロセスで発生する大気汚染物質の排出を対象とした。フェーズ2での排出量算定手法を用いて排出量を計算した。



4.2. 排出量計算方法

- 1. レンガ工場でのレンガ製造プロセスで発生する大気汚染物質の排出量算定方法は以下のとおりである。

Emissions = ∑ AD×EF

Emissions: 大気汚染物質の排出量 (g/year)
AD: レンガ生産量 (ton/year)
EF: レンガ製造プロセスにおける排出係数 (g/ton)

4.3. 活動量

- 1. 活動量はレンガの出荷重量である。
- 2. UB市の統計サイト*1の年間のレンガの出荷量（個数）にレンガ1個当たりの重量（3.2kg/個）*2を乗じて、出荷重量を計算した。

	単位	2018	2019	2020	2021
レンガ	百万個	14	15.6	5.6	6.7
	ton/year	44,800	49,920	17,920	21,440

*1 <http://ubstat.mn/StatTable=362>
*2 フェーズ2での実測調査に基づく

4.4. 排出係数

- 1. モンゴルでの排出係数がないため、US EPAのAP-42の値を用いた。

	PM	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO
Grinding and screening operations (破碎・ふるい運転) (Тээрэмдэж, шигших процесс)						
processing wet material (湿気を有する材料の処理) (Нойтон материал боловсруулалт)	0.025	0.0023	ND			
Coal-fired kiln (石炭焼き窯) (Нүүрс шатаах бааюу)				1.2	0.51	0.8
uncontrolled (未対策) (Арга хэмжээ аваагүй)	1.8	1.4	0.87			

ND: No Data
Unit: "lb/ton". To convert from "lb/ton" to "kg/Mg", multiply by 0.5.

4.5. 排出量の計算

- 1. UB市のレンガ工場からのレンガ製造プロセスでの大気汚染物質別排出量を以下のとおりである。

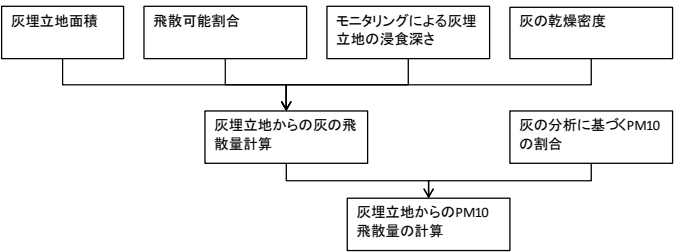
年	TSP	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO
2018	40.88	31.41	19.49	26.88	11.42	17.92
2019	45.55	35.00	21.72	29.95	12.73	19.97
2020	16.35	12.56	7.80	10.75	4.57	7.17
2021	19.56	15.03	9.33	12.86	5.47	8.58

単位: ton/year

5.火力発電所灰埋め立て地からの灰の飛散

5.1. 概要

1. 火力発電所の灰埋め立て地において、風による灰の飛散を対象とした。フェーズ2までの排出量算定手法を用いて排出量を計算した。



5.2. 排出量計算方法

1. 火力発電所の灰埋め立て地における、灰の月別飛散量の算定方法は以下のとおりである。年間飛散量は、12か月分の月別飛散量の合計である

Emissions = ∑ AD×EF

EF = D × d

Emissions: 灰の飛散量 (g/month)
AD: 火力発電所の灰埋め立て地における灰の飛散可能面積 (m²)
EF: 灰の飛散係数 (g/cm²)
D: 灰埋め立て地の表面の浸食深さ (cm/month)
d: 焼却灰の乾燥密度 (1.041 g/cm³)

5.3. 活動量

1. 活動量は灰埋め立て地面積である。
2. 衛星画像での灰埋め立て地の覆土状況及び乾燥度合いから、月ごとに飛散可能な面積の割合を推定した。

場所		面積 (m²)	飛散可能な面積割合		
			2018	2020	2021
TPP-2	West	50,882	0%	0%-25%	0%-60%
	East	55,968	0%	0%	0%-55%
TPP-3	Southwest	119,000	0%	0%	0%
	Northwest	102,600	0%	0%	0%
	North middle	60,000	0%	0%	0%-60%
TPP-4	Middle	250,000	0%	0%-40%	0%-50%
	West	160,000	0%	0%-15%	0%-60%
	East	180,000	0%-80%	0%-50%	0%-80%



5.4. 灰の飛散係数

1. フェーズ1~2での現地測定調査で埋め立て地ごとに地表面の浸食厚さを測定した。

月	TPP-2		TPP-3		TPP-4			
	West	East	Southwest	Northwest	West	East	Southwest	West
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400
4	0.429	0.429	0.429	0.429	0.429	0.429	0.429	0.84
5	0.529	0.529	0.529	0.529	0.529	0.529	0.529	0.11
6	0.472	0.472	0.472	0.472	0.472	0.472	0.472	0.29
7	0.443	0.443	0.443	0.443	0.443	0.443	0.443	0.443
8	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400
9	0.343	0.343	0.343	0.343	0.343	0.343	0.343	0.343
10	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0

単位: cm

5.4. 灰の飛散係数 (2)

1. 2015年に、火力発電所の灰埋め立て地からサンプルを採取して、粒径分布の分析を行った。2016年以降サンプル採取ができなかったため、2016年以降のPM10の割合は、2015年の分析値と不変とみなした。

火力発電所	TPP-2	TPP-3	TPP-4
PM ₁₀ の割合	14.24%	29.44%	38.32%

5.5. 排出量の計算

1. 埋め立て地別に月別飛散量を計算したのち、年間の合計飛散量を計算した。

場所		2018		2020		2021	
		TSP	PM10	TSP	PM10	TSP	PM10
TPP-2	West	0	0	366.7	52.2	266.7	38.0
	East	0	0	0	0	490.4	69.8
TPP-3	Southwest	0	0	0	0	0	0
	Northwest	0	0	0	0	0	0
	North middle	0	0	0	0	799.2	235.3
TPP-4	Middle	0	0	1,798.0	471.8	3,785.7	993.4
	West	0	0	587.0	154.0	1,754.6	460.4
	East	1,859.0	712.37	2,199.0	842.7	1,894.6	726.0
Total		1,859.0	712.37	4,950.7	1,520.7	8,991.1	2,522.8

単位: ton/year

6. 主要な発生源の排出量との比較

2020年の排出量

	SO2	NOx	TSP	PM10	CO
PP	13,544	18,114	24,514	22,447	10,415
HOB	1,429	356	1,687	1,603	4,612
CFWH	498	126	73	63	4,414
Stove	5,651	1,586	1,521	1,404	52,294
Vehicle	298	3,546	244	244	20,287
RoadDust	-	-	3,423	3,423	-
Disposal site	-	-	0.3	0.1	-
Brick	11	5	16	13	7
PPAsh	-	-	4,951	1,521	-

単位: ton/year

7. まとめ (1)

1. 石炭燃焼起源、自動車以外の発生源の大気汚染物質排出量を推計した。
2. 今回の排出量算定は、主にフェーズ2での調査結果を使って推計したが、現状のレンガ工場の稼働状況及び廃棄物処分場での処分量（年間あるいは月間）をモンゴル側が市の担当部署に確認したうえで排出量を計算する。

7. まとめ (2)

1. 廃棄物処分場への処分による大気汚染物質排出量は、PMの排出量は石炭燃焼起源及び自動車からの排出に比べて非常に少なく、処分場は中心地から離れている。
2. レンガ工場でのレンガ製造プロセスによる排出量は、石炭燃焼起源及び自動車からの排出に比べて非常に少ない。
3. 廃棄物処分場やレンガ工場について、冬季におけるUB市中心部への大気汚染の影響はほとんどないと想定される。

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7. まとめ (3)

1. 火力発電所の灰埋め立て地からの灰の年間飛散量が多い事が推計されたが、火力発電所に灰の処分方法について、確認すべきである。
2. 特に大気汚染が酷い冬季では、埋め立て地の表面が凍結して飛散しないため、冬季の大気汚染への影響はほとんどない。
3. 一方、春の風の強い時期には飛散量が増えるため、冬季の大気汚染の課題が解消した後の検討課題である。

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8. プロジェクト終了後の課題

1. モンゴルの排出インベントリガイドラインに基づき、統計データや外国の排出係数を使って、示した発生源以外についても排出量の概算を把握する。
2. その結果、UB市の大気汚染に影響を与えそうな発生源があれば、必要に応じて詳細な調査及びデータ収集を行い、排出量の精度を向上すべきである。

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Thank you for your attention!

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2019年交通量・旅行 速度調査まとめ

2020/8/28
JICA専門家 仲田 伸也

1

目次

- 目的
- 交通量調査
 - 調査概要
 - 調査結果
 - 考察
- 旅行速度調査
 - 調査概要
 - 調査結果
 - 考察

2

目的（１）

2019年のUB市内における自動車交通量の実態を把握すること

2010年にUB市内の交通量・旅行速度調査実施

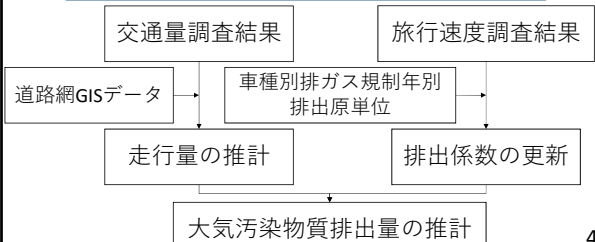
- 新規道路の建設（太陽橋等）
- 既存道路の拡幅工事
- 自動車登録台数の増加

現状の交通実態の把握の必要性

3

目的（２）

2019年の自動車排出ガスによる大気汚染物質排出量を推計すること



4

交通量調査

5

調査概要

項目	概要
期間	非冬期：2019年9月19日～20日、21日～22日 冬期：2019年12月5日～6日、7日～8日
調査時間	24時間（6時～翌朝6時） 16時間（6時～22時）
調査地点	45地点
調査方法	調査員による現地計測 カメラによる連続撮影（後日調査員が計測）
調査項目	二輪車、小型・中型自動車、大型自動車、トロリーバス、マイクロ・小型バス、中型・大型バス、小型トラック、中型・大型トラック、その他（建設機械等）

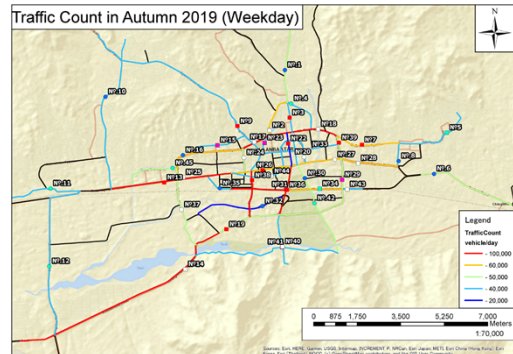
6

推計後の地点別交通量

Link No.	Location	Lane	Autumn-Weekday Count	Winter-Weekday Count	Link No.	Location	Lane	Autumn-Weekday Count	Winter-Weekday Count
1	Rural	4	42,090	18,527	24	Sub-urban	4	48,605	
2	Sub-urban	4	55,261		25	Sub-urban	6	77,092	
3	Sub-urban	4	33,730	32,914	26	Central	6	53,335	46,092
4	Sub-urban	4	32,081		27	Central	6	50,067	
5	Rural	4	21,472		28	Sub-urban	6	56,491	
6	Rural	6	43,428	38,774	29	Central	4	40,550	40,652
7	Sub-urban	6	50,280	56,674	30	Central	4	42,500	45,173
8	Sub-urban	4	37,964	36,478	31	Central	4	63,270	100,167
9	Sub-urban	4	36,220	36,949	32	Sub-urban	4	19,687	20,218
10	Rural	4	38,401	15,763	33	Central	6	36,778	
11	Rural	4	32,975		34	Central	4	58,776	
12	Rural	4	32,604		35	Sub-urban	6	35,679	36,638
13	Rural	8	76,274	96,300	36	Central	6	65,984	70,510
14	Rural	6	67,486		37	Sub-urban	4	48,951	
15	Sub-urban	4	34,324	49,189	38	Central	4	60,052	69,600
16	Sub-urban	6	57,811	58,935	39	Central	6	41,898	47,460
17	Sub-urban	4	77,848		40	Rural	4	35,464	
18	Central	6	80,551		41	Rural	2	27,487	29,437
19	Sub-urban	6	47,115	44,436	42	Sub-urban	4	41,655	
20	Central	4	33,202		43	Sub-urban	4	37,624	
21	Central	4	26,287		44	Sub-urban	4	26,257	
22	Central	4	15,874	24,147	45	Sub-urban	4	46,098	
23	Central	4	35,915	32,868					

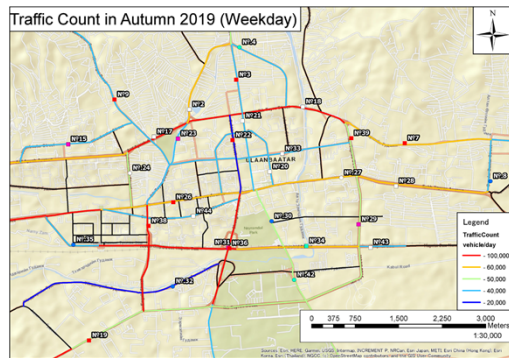
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地点別交通量分布 (秋・平日)



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地点別交通量分布 (秋・平日)



15

未測定交通量の推計

- 測定していない地点の交通量推計
 - カテゴリ別に以下の方法で24時間交通量を推計

$$TC_{(nmp,sea,we)} = TC_{(nmp,sea,wd)} \times \frac{\sum TC_{(mp,sea,we)}}{\sum TC_{(mp,sea,wd)}}$$

- TC(nmp,sea,we): 未測定地点の季節別休日交通量
- TC(nmp,sea,wd): 未測定地点の季節別平日交通量
- TC(mp,sea,we): 測定地点の季節別休日交通量
- TC(mp,sea,wd): 測定地点の季節別平日交通量

- 時刻別交通量推計は測定地点での時刻別交通量から24時間変化パターンを作成

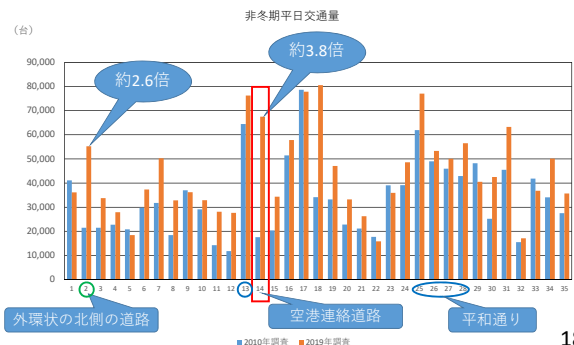
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推計後の地点別交通量

Link No.	Location	Lane	Autumn		Winter		Link No.	Location	Lane	Autumn		Winter	
			Weekday	Weekend	Weekday	Weekend				Weekday	Weekend	Weekday	Weekend
1	Rural	4	42,090	44,162	18,527	16,930	24	Sub-urban	4	48,605	47,986	52,886	50,449
2	Sub-urban	4	55,261	54,527	59,904	57,219	25	Sub-urban	6	77,092	74,756	79,384	79,378
3	Sub-urban	4	33,730	32,063	32,914	25,533	26	Central	6	53,335	52,244	46,092	50,345
4	Sub-urban	4	32,081	31,874	33,931	32,491	27	Central	6	50,067	47,324	51,014	54,971
5	Rural	4	21,472	22,576	27,947	23,879	28	Sub-urban	6	56,491	55,046	58,151	58,083
6	Rural	6	43,428	44,543	38,774	46,035	29	Central	4	40,550	39,510	40,652	36,808
7	Sub-urban	6	50,280	46,833	56,674	42,571	30	Central	4	42,500	42,641	45,173	41,023
8	Sub-urban	4	37,964	37,373	36,478	35,694	31	Central	4	63,270	71,309	100,167	90,114
9	Sub-urban	4	36,220	37,951	36,949	28,826	32	Sub-urban	4	19,687	20,197	20,218	22,598
10	Rural	4	38,401	40,208	35,682	36,287	33	Central	6	36,778	34,786	37,469	40,593
11	Rural	4	32,975	34,358	46,316	46,798	34	Central	4	58,776	59,072	70,812	63,462
12	Rural	4	32,604	33,547	65,448	53,481	35	Sub-urban	6	35,679	35,045	36,638	36,630
13	Rural	8	76,274	80,646	96,300	68,119	36	Central	6	65,984	57,362	70,510	50,421
14	Rural	6	67,486	70,596	83,621	83,012	37	Sub-urban	4	48,951	48,745	52,729	52,788
15	Sub-urban	4	34,324	32,323	49,189	45,859	38	Central	4	60,052	59,791	69,600	52,496
16	Sub-urban	6	57,811	55,787	58,935	58,915	39	Central	6	41,898	43,586	47,460	45,241
17	Sub-urban	4	77,848	77,420	84,085	82,137	40	Rural	4	35,464	35,507	42,054	40,416
18	Central	6	80,551	76,046	79,160	86,063	41	Rural	2	27,487	25,619	29,437	33,633
19	Sub-urban	6	47,115	46,806	44,436	52,753	42	Sub-urban	4	41,655	43,006	43,239	48,732
20	Central	4	33,202	33,352	40,184	35,678	43	Sub-urban	4	37,624	37,511	40,031	39,127
21	Central	4	26,287	26,436	31,843	28,367	44	Central	4	26,257	26,538	31,960	28,847
22	Central	4	15,874	17,015	24,147	15,096	45	Sub-urban	4	46,098	46,198	49,928	50,178
23	Central	4	35,915	29,570	32,868	29,692							

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2010年調査との比較



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結果の考察 (1)

- 2010年の調査と比べて、交通量は平均約1.4倍
 - 2010年調査時点ではナンバープレートの番号による平日走行規制は実施されていない。
 - 車検合格台数の増加率ほど、交通量増加していない。
→複数台所有の傾向

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
車検合格台数	162,710	209,791	228,952	257,498	297,008	331,564	339,626	365,819	401,725	368,480
増加率 (2010年比)	-	1.29	1.41	1.58	1.83	2.04	2.09	2.25	2.47	2.26

出典：Mongolian Statistical Information Service (www.1212.mn)
NUMBER OF VEHICLES PASSED THE TECHNICAL INSPECTION, by type, by region, aimag and soum, yearly

19

結果の考察 (2)

- 2010年の調査と比較して、最大で3.8倍、最小で0.8倍であった。
 - 減った地点は、新設道路、既設道路の拡張等の影響を受けていると思われる。
 - 例：No33のBeijing Streetは2010年以降に道路幅の拡張工事、エルベ川に架かる橋の架け替え工事が行われた。
 - 増加地点は、周辺の住宅などの開発によるものとみられる。
 - 例：No14の空港連絡道路は、沿道にショッピングモール (Hunuu Mall) の建設、道路の南側に多くのマンションが建設された。

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旅行速度調査

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調査概要

項目	概要
期間	非冬期：2019年9月17日（火）、21日（土） 冬期：2019年12月5日（木）、7日（土）
調査回数	1日4回 （朝：7時～9時、昼：13時～15時、 夕：17時～19時、夜：22時～24時）
調査ルート	3ルート
調査方法	実際の交通の流れに沿って運転 自動車に取り付けたGPS装置で位置情報を収集
調査項目	測定対象自動車の位置情報とその時間 交通状況に関するメモ

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調査地点



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調査実施 (2019年9月)



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調査結果



主要交差点でルートをも10〜15区間に分割

Link No	Distance (m)	Time (h:mm:ss)	Time (s)	Speed (km/h)
1	1,189.07	0:01:21	81	52.8
2	4,270.21	0:27:02	1,622	9.5
3	1,300.52	0:12:01	721	6.5
4	2,695.75	0:22:20	1,340	7.2
5	647.69	0:02:42	162	14.4
6	1,595.43	0:09:55	595	9.7
7	1,093.15	0:05:33	333	11.8
8	573.08	0:02:08	128	16.1
9	437.69	0:01:30	90	17.5
10	367.68	0:04:09	249	5.3
11	1,249.34	0:05:04	304	14.8

位置関係から区間を割当

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調査結果の解析手順

- 約10秒ごとの自動車の位置情報から区間別所要時間を計算
- 区間距離を所要時間で除して、区間平均旅行速度を計算
- 3つのルートそれぞれで区間別進行方向別平均旅行速度を計算

区間平均旅行速度計算例 (Route 1の往路)

Link No	Distance (m)	Time (h:mm:ss)	Time (s)	Speed (km/h)
1	1,189.07	0:01:21	81	52.8
2	4,270.21	0:27:02	1,622	9.5
3	1,300.52	0:12:01	721	6.5
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8	573.08	0:02:08	128	16.1
9	437.69	0:01:30	90	17.5
10	367.68	0:04:09	249	5.3
11	1,249.34	0:05:04	304	14.8

26

解析結果 (Route 1)

Season	Direction	Distance (m)	Time (h:mm:ss)	Time (s)	Speed (km/h)
Non-Winter	往	1,189.07	0:01:21	81	52.8
Non-Winter	往	4,270.21	0:27:02	1,622	9.5
Non-Winter	往	1,300.52	0:12:01	721	6.5
Non-Winter	往	2,695.75	0:22:20	1,340	7.2
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Non-Winter	往	367.68	0:04:09	249	5.3
Non-Winter	往	1,249.34	0:05:04	304	14.8
Winter	往	1,189.07	0:01:21	81	52.8
Winter	往	4,270.21	0:27:02	1,622	9.5
Winter	往	1,300.52	0:12:01	721	6.5
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Winter	往	367.68	0:04:09	249	5.3
Winter	往	1,249.34	0:05:04	304	14.8

"#N/A"は、データ欠測により所要時間が計算できなかった区間

27

解析結果 (Route 2)

Season	Direction	Distance (m)	Time (h:mm:ss)	Time (s)	Speed (km/h)
Non-Winter	往	1,189.07	0:01:21	81	52.8
Non-Winter	往	4,270.21	0:27:02	1,622	9.5
Non-Winter	往	1,300.52	0:12:01	721	6.5
Non-Winter	往	2,695.75	0:22:20	1,340	7.2
Non-Winter	往	647.69	0:02:42	162	14.4
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Non-Winter	往	437.69	0:01:30	90	17.5
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Winter	往	4,270.21	0:27:02	1,622	9.5
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Winter	往	437.69	0:01:30	90	17.5
Winter	往	367.68	0:04:09	249	5.3
Winter	往	1,249.34	0:05:04	304	14.8

"#N/A"は、データ欠測により所要時間が計算できなかった区間

28

解析結果 (Route 3)

Season	Direction	Distance (m)	Time (h:mm:ss)	Time (s)	Speed (km/h)
Non-Winter	往	1,189.07	0:01:21	81	52.8
Non-Winter	往	4,270.21	0:27:02	1,622	9.5
Non-Winter	往	1,300.52	0:12:01	721	6.5
Non-Winter	往	2,695.75	0:22:20	1,340	7.2
Non-Winter	往	647.69	0:02:42	162	14.4
Non-Winter	往	1,595.43	0:09:55	595	9.7
Non-Winter	往	1,093.15	0:05:33	333	11.8
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Non-Winter	往	437.69	0:01:30	90	17.5
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Non-Winter	往	1,249.34	0:05:04	304	14.8
Winter	往	1,189.07	0:01:21	81	52.8
Winter	往	4,270.21	0:27:02	1,622	9.5
Winter	往	1,300.52	0:12:01	721	6.5
Winter	往	2,695.75	0:22:20	1,340	7.2
Winter	往	647.69	0:02:42	162	14.4
Winter	往	1,595.43	0:09:55	595	9.7
Winter	往	1,093.15	0:05:33	333	11.8
Winter	往	573.08	0:02:08	128	16.1
Winter	往	437.69	0:01:30	90	17.5
Winter	往	367.68	0:04:09	249	5.3
Winter	往	1,249.34	0:05:04	304	14.8

"#N/A"は、データ欠測により所要時間が計算できなかった区間

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結果の考察

- 平日
 - 中心部では朝〜夕の時間帯で旅行速度が遅かった。通勤ラッシュ及び業務利用等による混雑が原因とみられる。
 - 夜間は車がすくため、旅行速度が速い傾向が見られた。
- 週末
 - 昼〜夕方、買い物等での混雑による旅行速度の低下がみられた朝と夜はで
- 非冬期と冬期の違い
 - Route 1では冬期の方が遅い傾向が見られたが、Route 2と3では季節による違いはあまり見られなかった。

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今後の予定

- 交通量調査と旅行速度調査結果を適用した
2019年の自動車からの大気汚染物質排出量を
計算
 - 未測定調査地点の交通量推計
 - 該当リンクへの交通量の割り当て
 - 旅行速度区分の設定変更
 - 日本の排出原単位の更新
- これまでの計算に関する見直しの検討
 - 交通量伸び率

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ご清聴ありがとうございました

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2020年の濃度シミュレーション結果

2022/10/5

JET 仲田

1

目次

1. 目的
2. 計算概要
 1. 排出量
 2. 気象
 3. 大気環境濃度
3. シミュレーションモデル概要
4. シミュレーション結果
5. まとめ

2

目的

1. 2020年冬季のSO₂濃度が前年よりも高くなっており、高濃度の要因を検証する。
2. 2020年の改良燃料使用時の冬季の大気汚染構造を把握し、2018年の生炭使用時と比較することで、改良燃料使用に伴う大気汚染の低減効果を確認する。

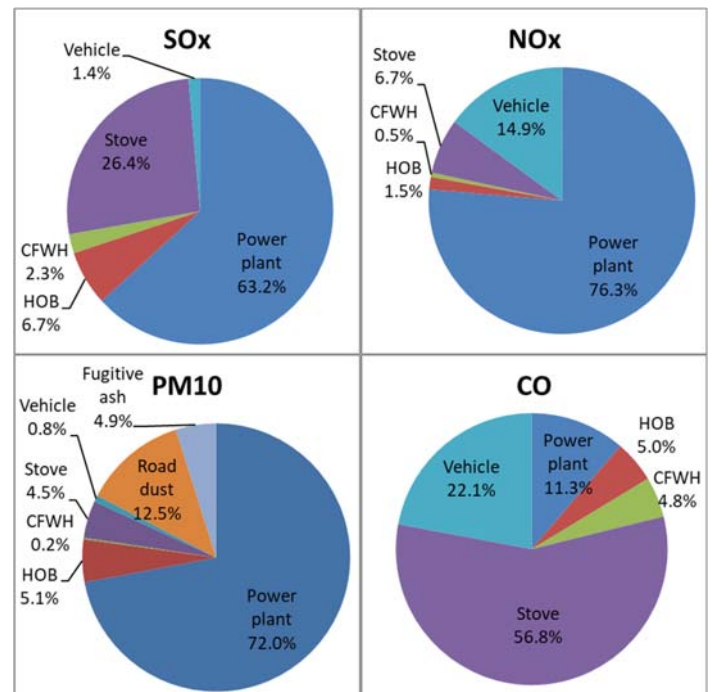
2018年のデータを用いて構築した大気拡散モデルに、2020年の排出量データを入力データとしたシミュレーションを実行した。

3

計算概要－排出量

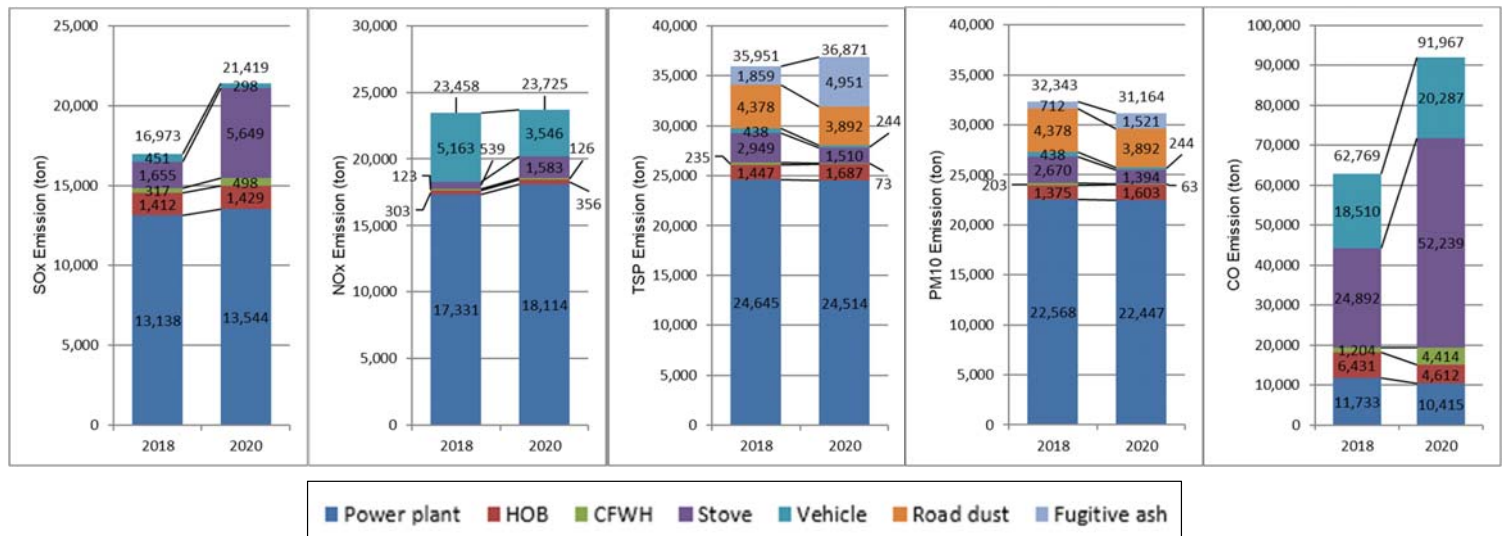
	SO _x	NO _x	TSP	PM ₁₀	CO
火力発電所	13,544	18,114	24,514	22,447	10,415
HOB	1,429	356	1,687	1,603	4,612
CFWH	498	126	73	63	4,414
家庭用小型ストーブ	5,649	1,583	1,510	1,394	52,239
自動車	298	3,546	244	244	20,287
道路粉塵			3,892	3,892	
発電所灰飛散			4,951	1,521	
合計	21,419	23,725	36,871	31,164	91,967

単位: ton/year

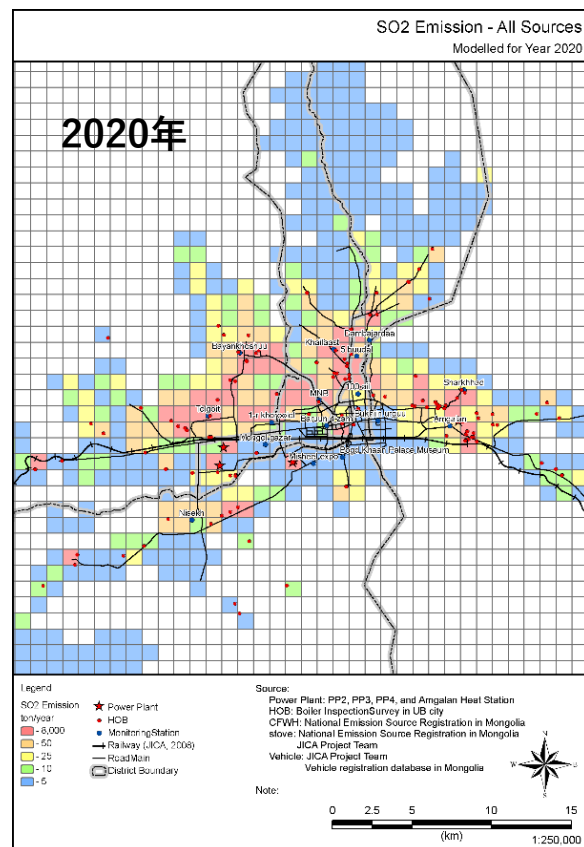
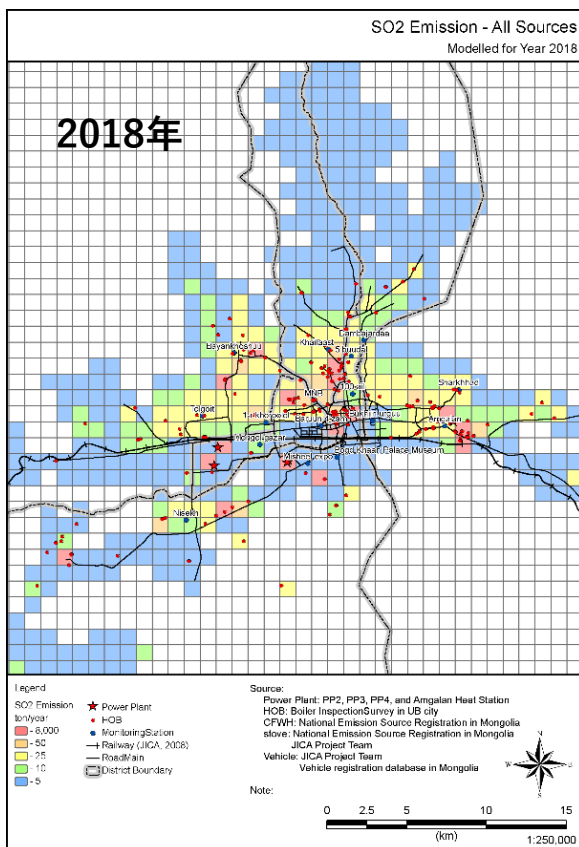


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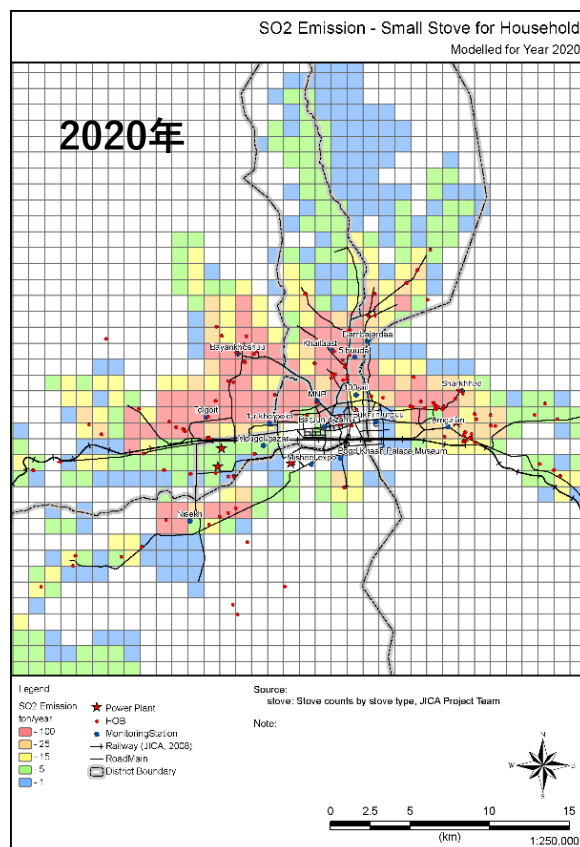
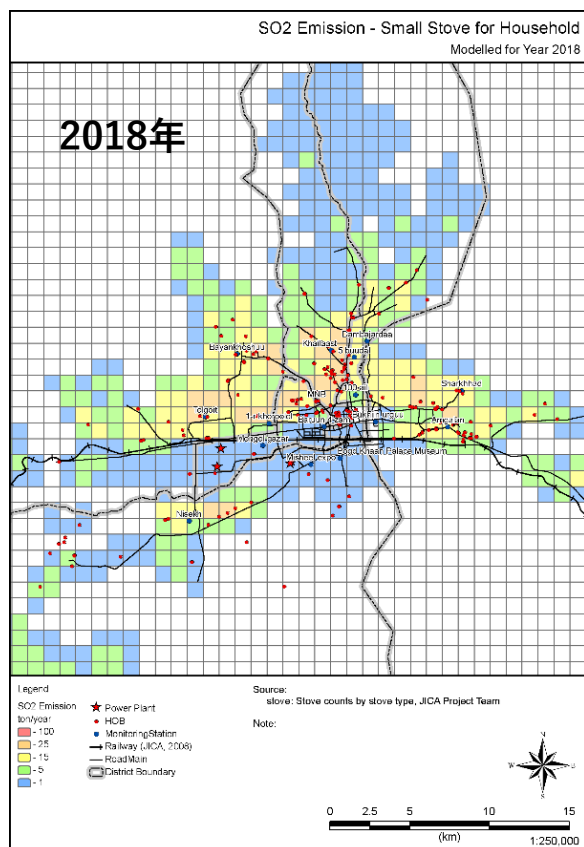
2018年と2020年の排出量の比較



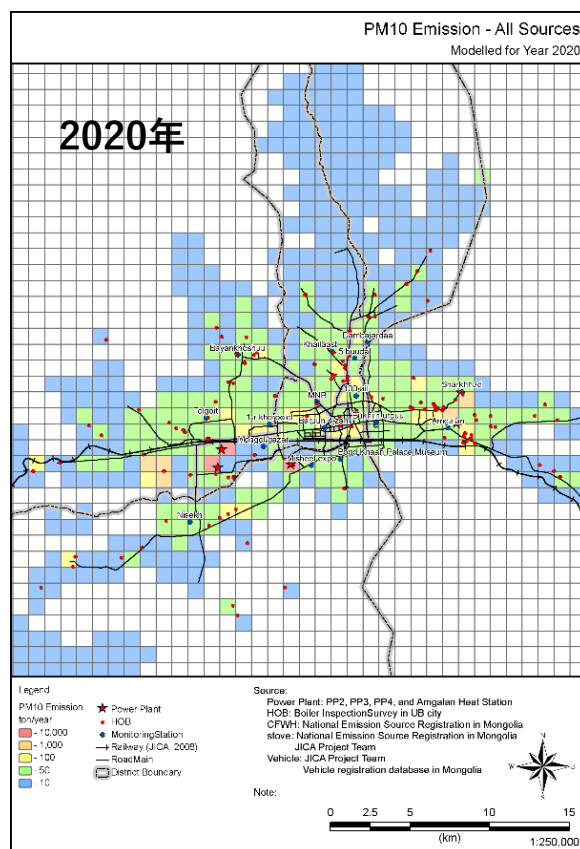
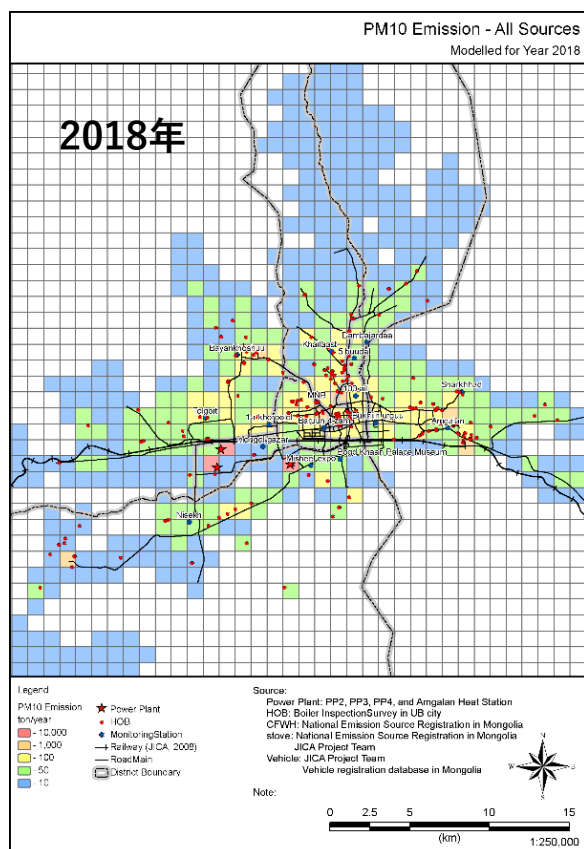
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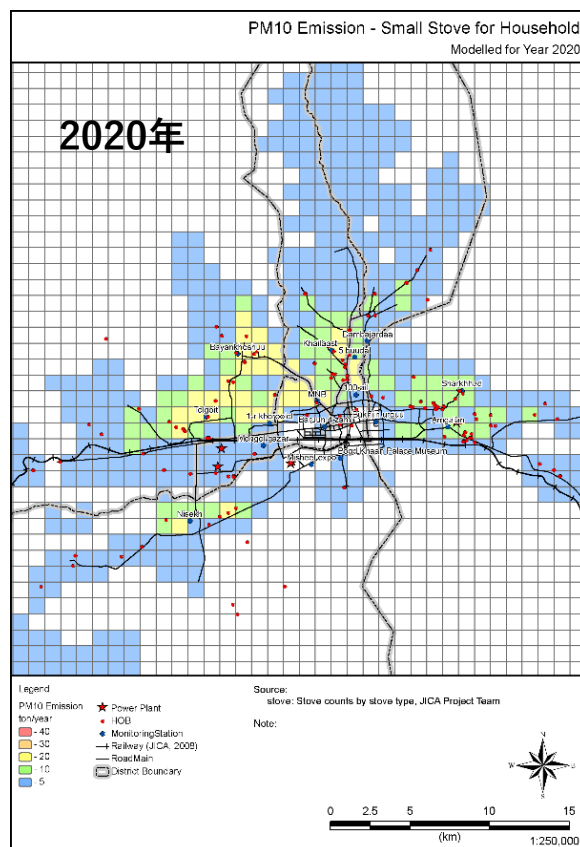
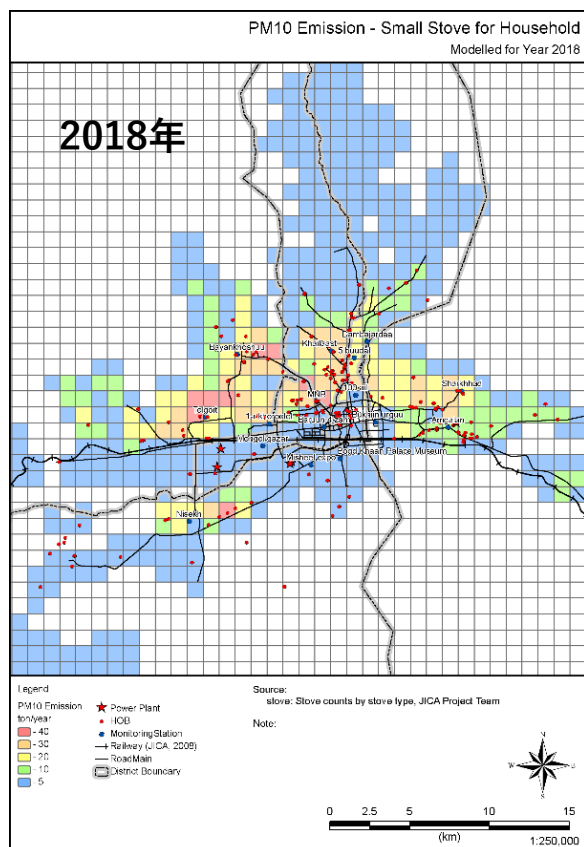
6



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計算概要一気象

項目	D1 (Whole Mongolia)	D2 (Central Mongolia)	D3 (Whole UB city)
Version	WRF-ARW v4.1.5		
Horizontal Coordinate System	Lambert conformal conic projection Standard Latitude: 30 N, 60 N Standard Longitude: 105.9 E		
Vertical Coordinate System	σ -P Coordinate System The top layer 50 hPa (about 19,000 m)		
Grid Number	160 × 94 × 32	121 × 121 × 32	91 × 91 × 32
Resolution	20 km	5 km	1 km
Height at the Bottom Layer	About 27 m		

計算概要一気象

Contents	D1 (Whole Mongolia)	D2 (Central Mongolia)	D3 (Whole UB city)
Microphysics	WRF Single-Moment 5 class scheme		
Longwave Radiation	RRTM scheme		
Shortwave Radiation	Dudhia scheme		
Surface Layer	Eta similarity		
Land Surface	Noah land surface model		
Planetary Boundary Layer	Mellor-Yamada-Janjic scheme		
Cumulus Parameterization	Betts-Miller-Janjic scheme (d3=0)		
Landuse	USGS (WRF default)		
Data Nudging	Wind, temperature, and moisture vapor (Nudging Coefficient: 10 ⁻⁴ 1/s)		
Objective Analysis Data	- Meteorological data: - NCEP GDAS/FNL 0.25 Degree Global Tropospheric Analyses and Forecast Grids, every 6 hours		

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計算概要一大気環境濃度(2020/11-2021/2)

		Misheel Expo	西交差点 (UB2局)	第1住宅地区	第13住宅地区 (相撲宮殿)	100世帯	火力発電所	Urgakh Naran住宅地区 (郊外)	Khailaast	Bogd khaan Museum	Tolgoit	MNB	Amgalan	Nisekh
SO2	Count	2874	2873	493	2872	2874	2875	2815	2879	2841	411	2664	2779	2761
	Percent	99.8%	99.8%	17.1%	99.7%	99.8%	99.8%	97.7%	100.0%	98.6%	14.3%	92.5%	96.5%	95.9%
	Average	77.70	126.19	238.34	103.81	249.98	99.45	73.85	291.42	53.14	3.79	286.94	117.90	173.91
	Max	661	843	1008	663	1393	880	408	1210	368	687.26	2330.22	832.35	1209.8
	Min	0	3	13	4	7	1	0	11	1	-0.53	16.91	-9.2	3.75
PM10	Count	2679	2869	2489	2877	2840	2853	2857	2804	2849	2781	2671	2778	2761
	Percent	93.0%	99.6%	86.4%	99.9%	98.6%	99.1%	99.2%	97.4%	98.9%	96.6%	92.7%	96.5%	95.9%
	Average	82.05	112.51	154.77	113.16	153.69	155.58	118.18	172.43	118.37	86.94	104.98	88.33	79.19
	Max	384	1399	3160	549	1919	2648	1403	764	9975	762.6	462.3	581.4	545.9
	Min	4	2	7	6	0	16	11	1	0	2.5	3.7	1.8	4.6

Count: 有効測定時間数、Percent: 対象期間での有効測定時間数の割合、濃度の単位: µg/m3

灰色は有効測定時間数が68.5%を下回っているため、モデルでの計算結果との比較対象から除外する。

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シミュレーションモデル概要

項目	内容
使用モデル	CALPUFF Ver7.2.1
地形データ	SRTM30/GTOPO30 Global Data (0 to 900 m, 30 arc-sec)
土地利用データ	USGS Land Use/Land Cover Scheme Eurasia (optimized for Asia)
気象モデル	WRF-ARW v4.1.5
計算対象領域	UB市中心地域を含んだ34 km × 28 km
解像度	1 km × 1 km
対象汚染物質	SO ₂ , NO _x , TSP, PM ₁₀ , SO ₄ , NO ₃ , HNO ₃ , CO
発生源データ	2020年の排出インベントリ 火力発電所、HOB、CFWH、家庭用小型ストーブ、自動車（幹線道路、細街路）、道路巻き上げ粉塵、発電所灰埋め立て地からの灰飛散
計算期間	2018/3/1～2019/2/28
濃度計算地点	大気環境測定局の位置座標 1 km × 1 kmグリッドの中心座標

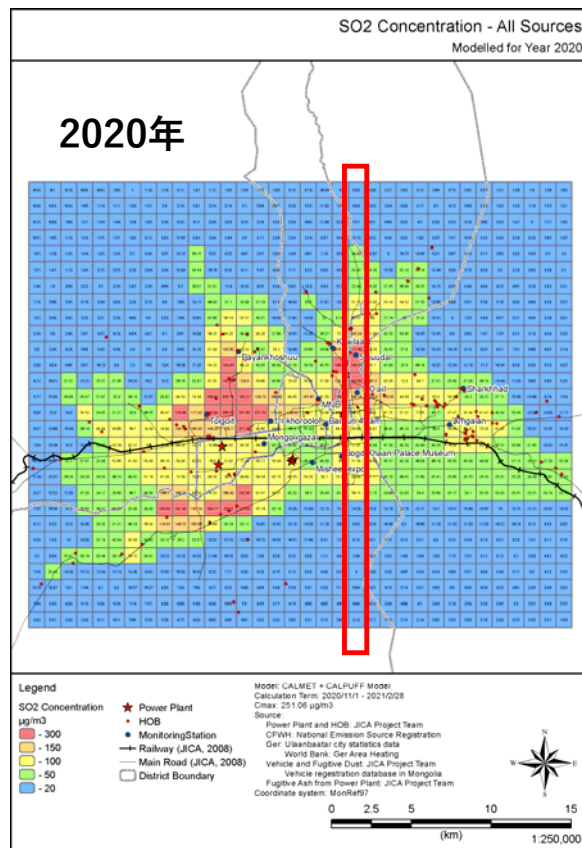
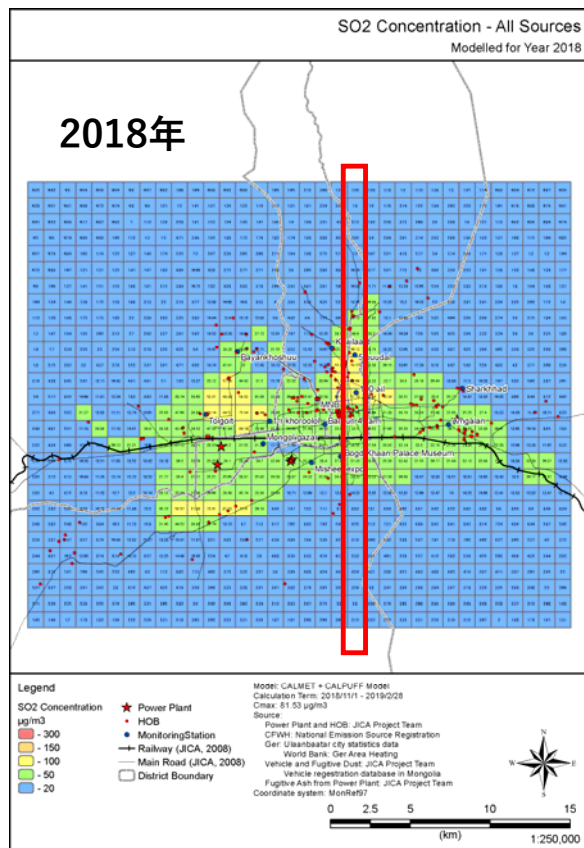
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シミュレーション結果

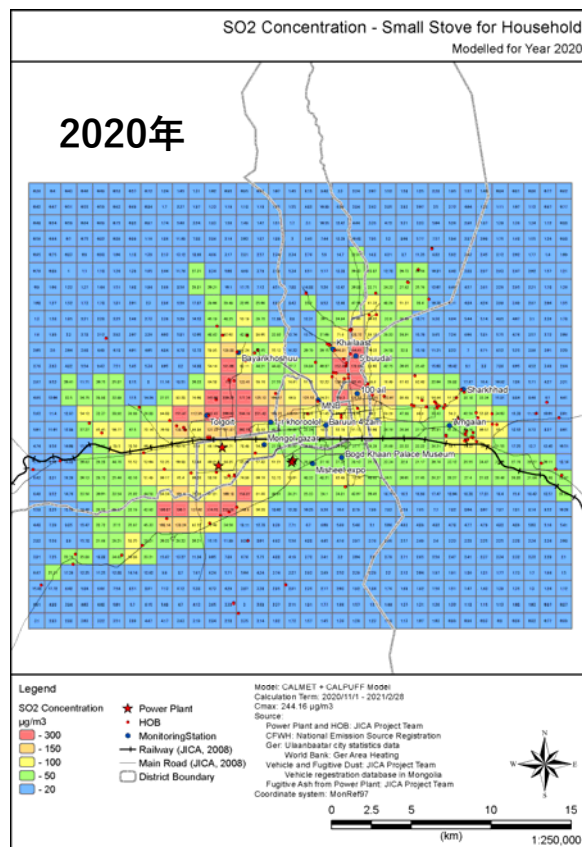
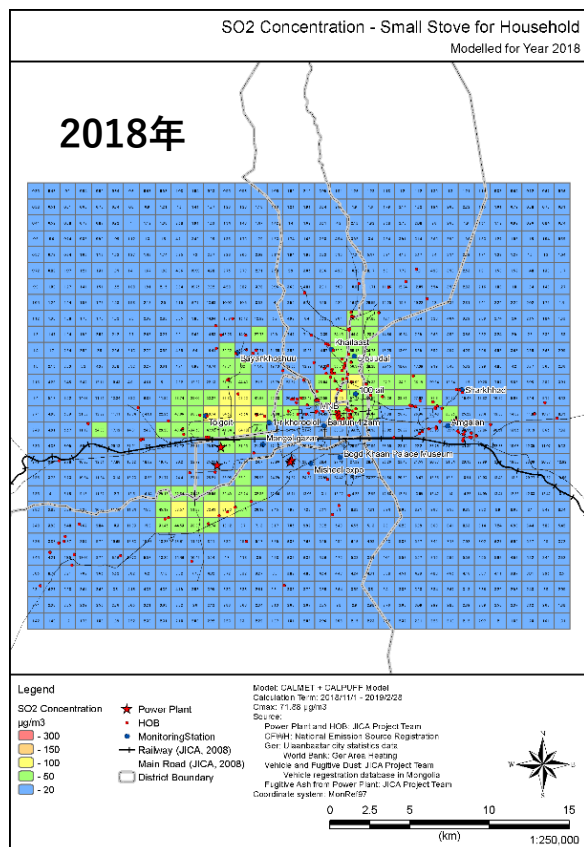
- 2018年の生炭使用時と2020年の改良燃料使用時の冬季の大気汚染構造を把握した。
 1. SO₂高濃度の要因の確認
 2. 改良燃料使用に伴うPM₁₀の低減効果の確認

* PM₁₀濃度は、PMF解析結果に基づいて補正する前のものである

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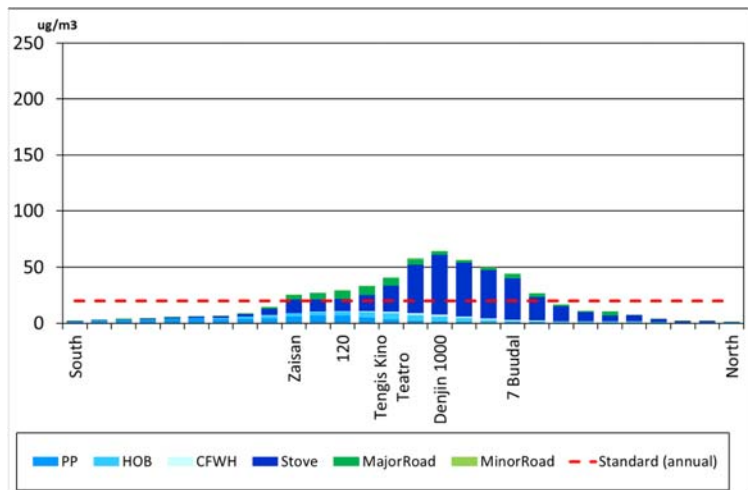
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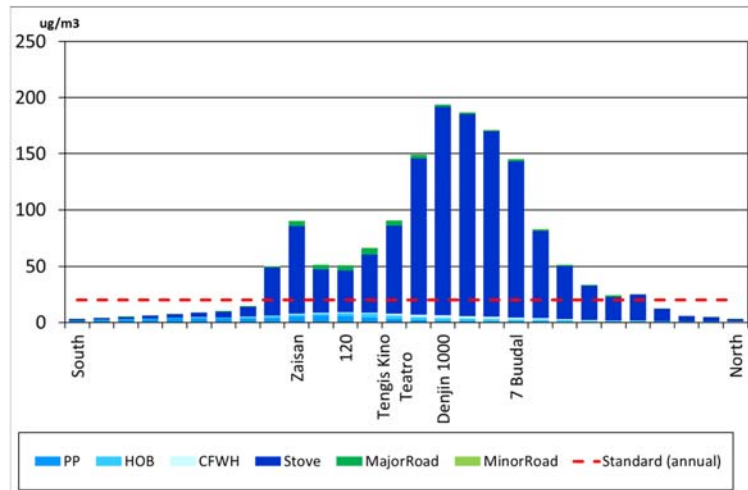
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寄与濃度断面図 (SO₂)

2018年



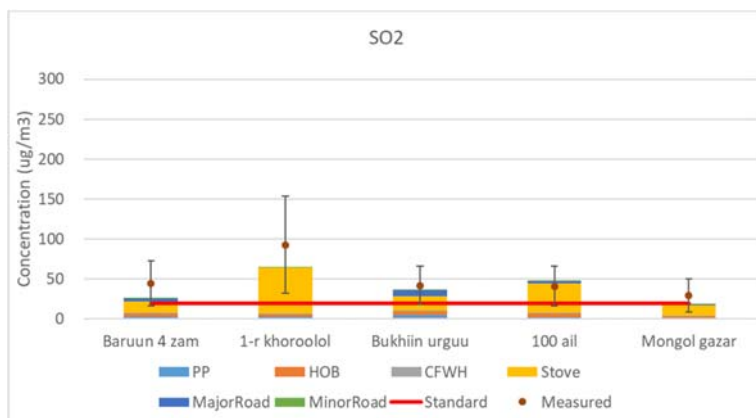
2020年



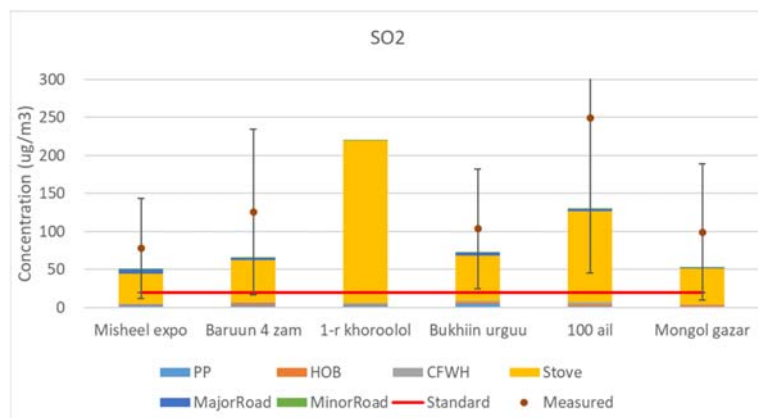
17

測定局での実測値と計算値の比較 (SO₂)

2018年

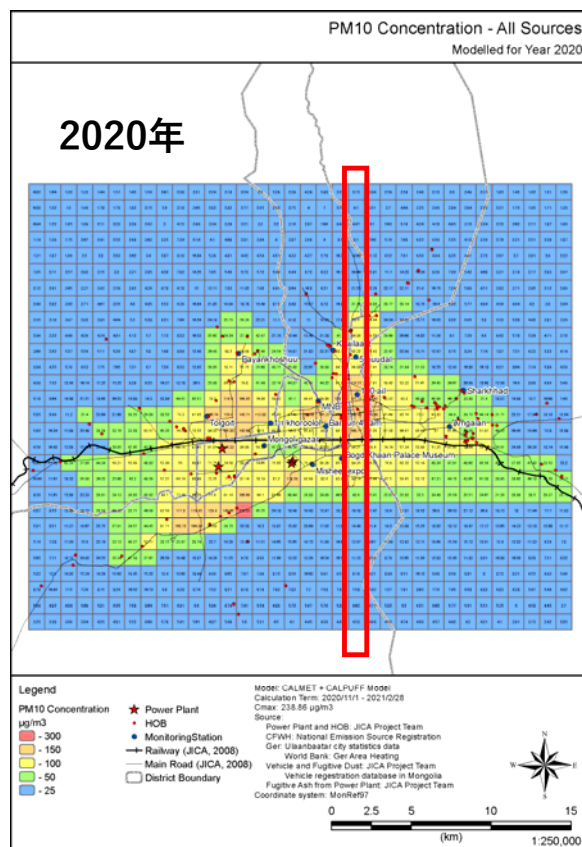
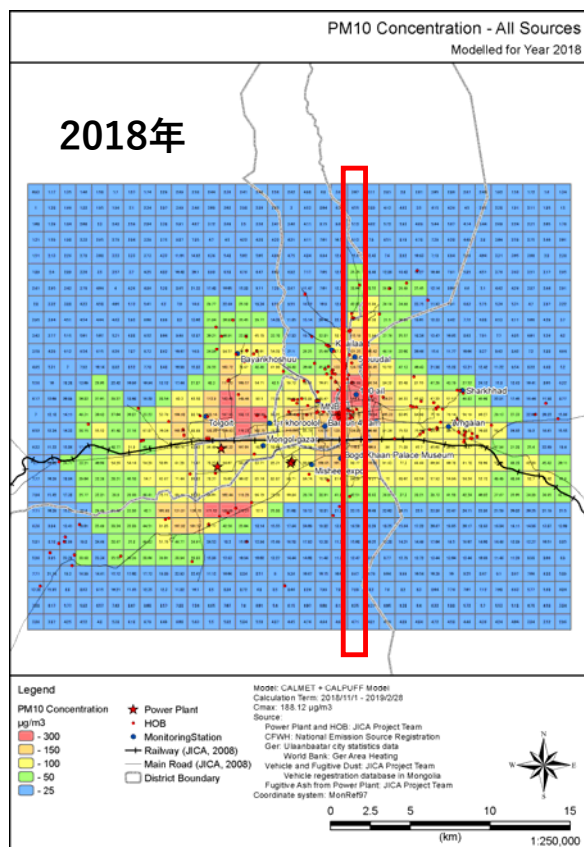


2020年

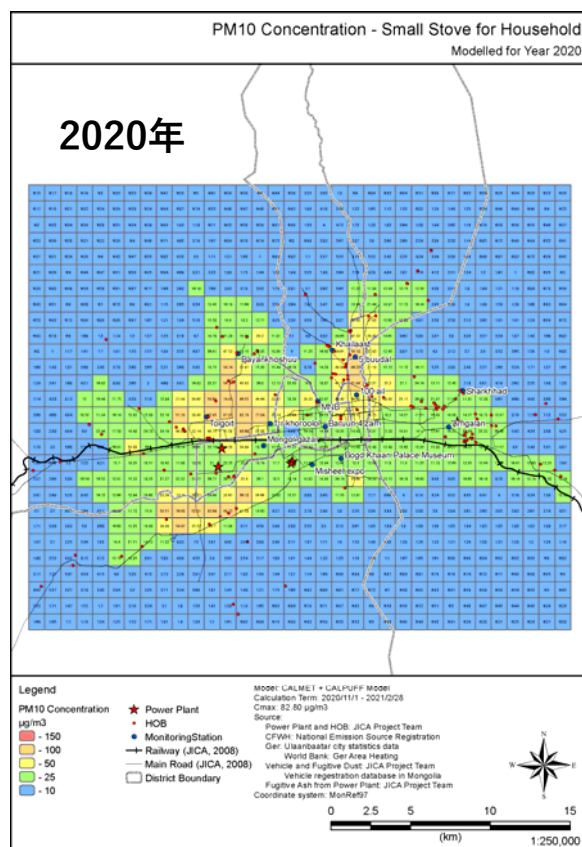
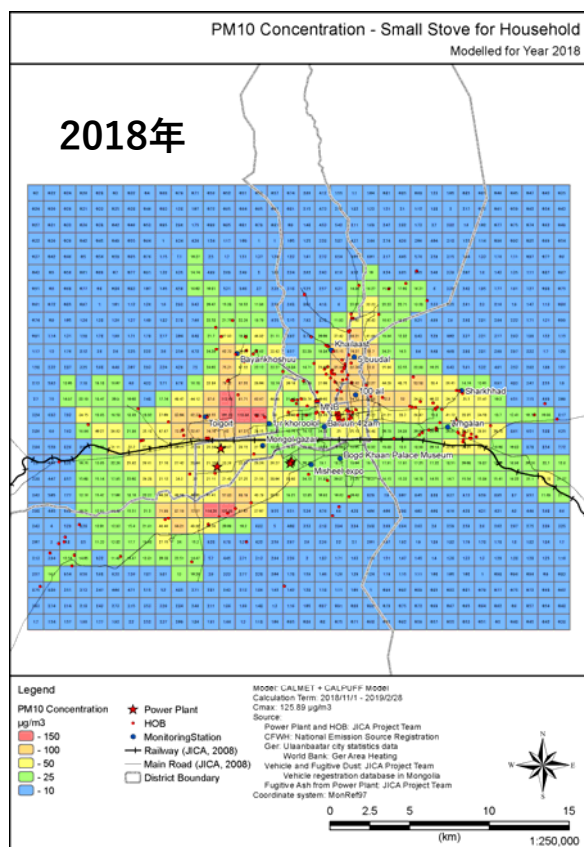


黒の縦棒：標準偏差

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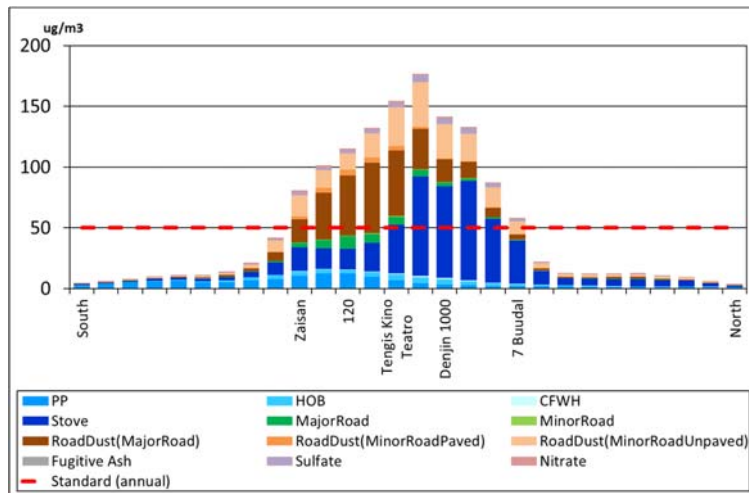
19



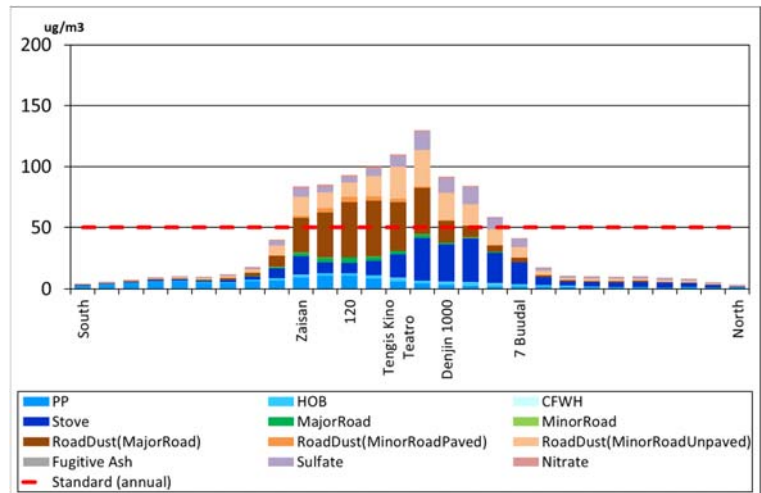
20

寄与濃度断面図 (PM10)

2018年



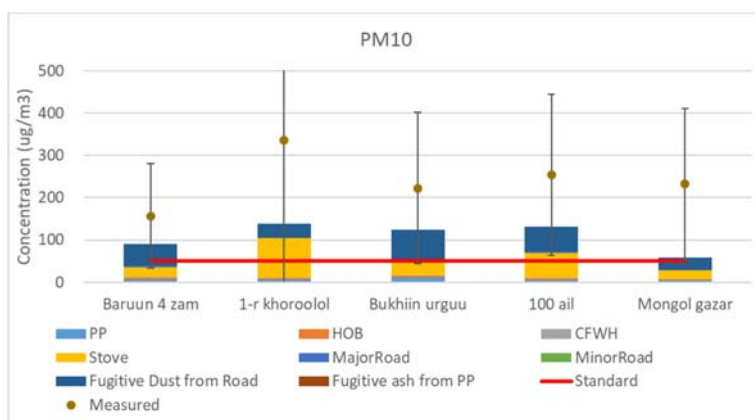
2020年



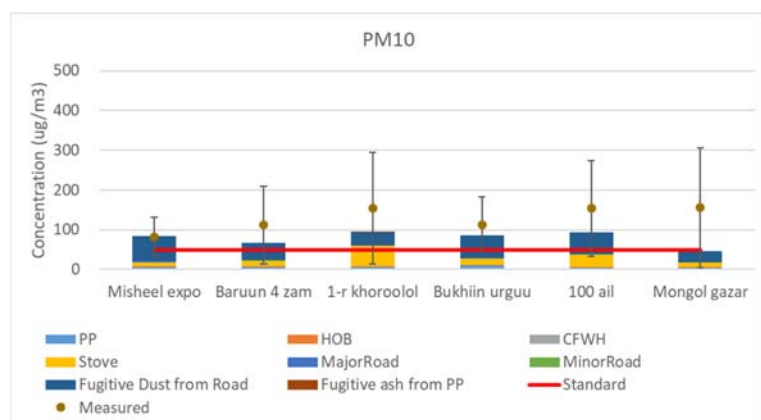
21

測定局での実測値と計算値の比較 (PM10)

2018年

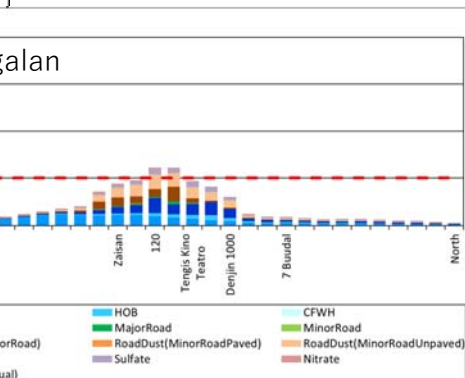
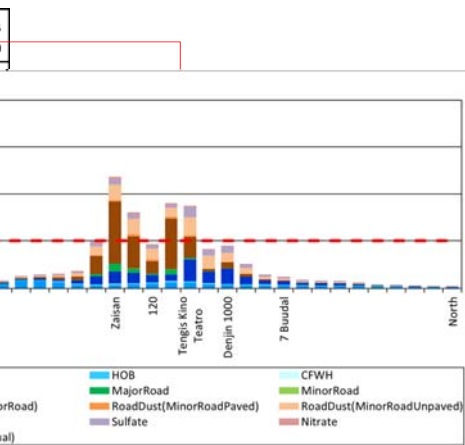
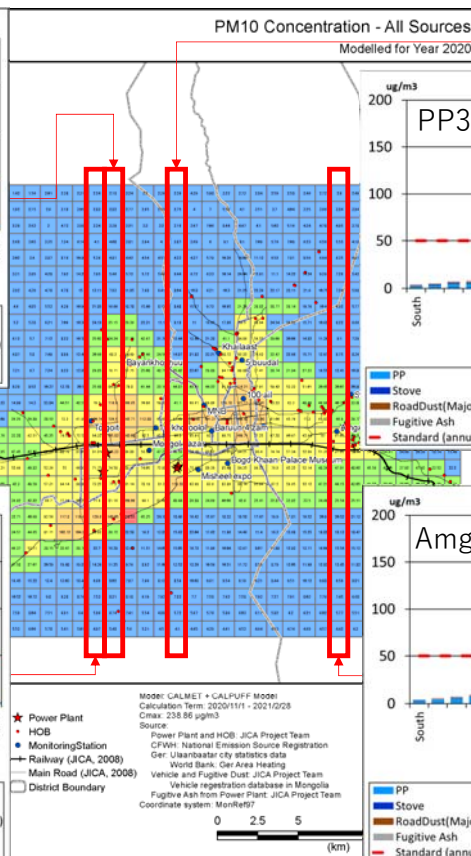
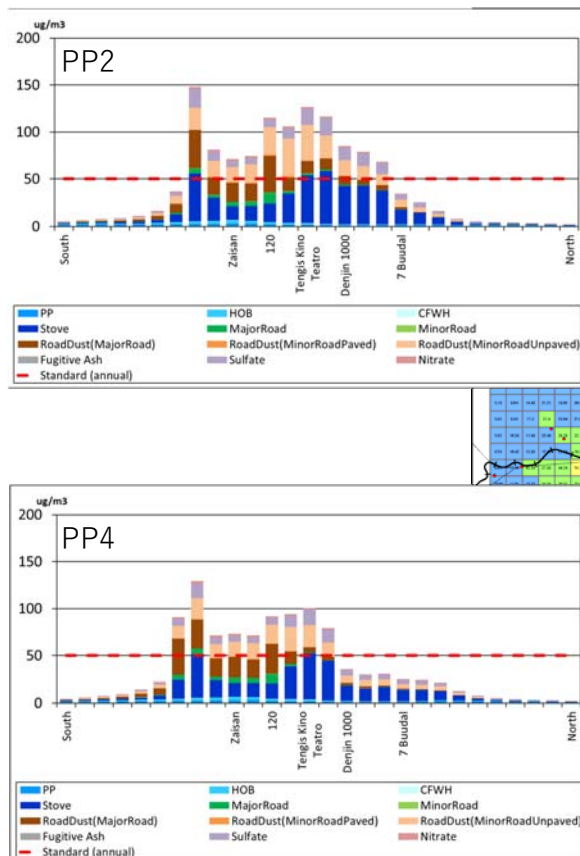
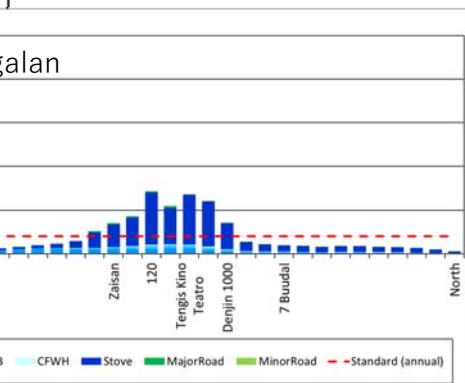
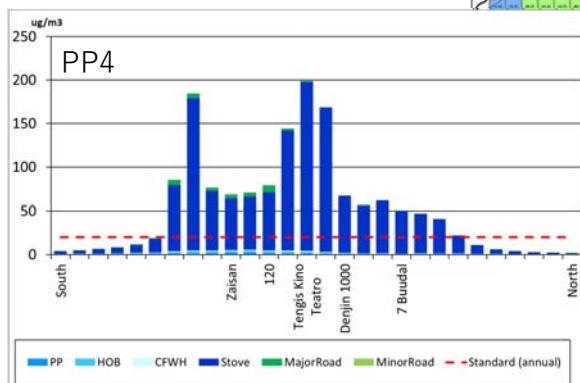
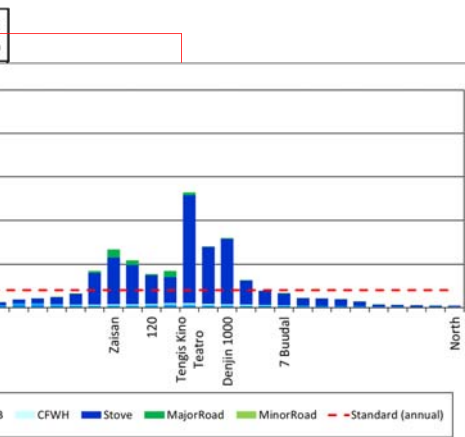
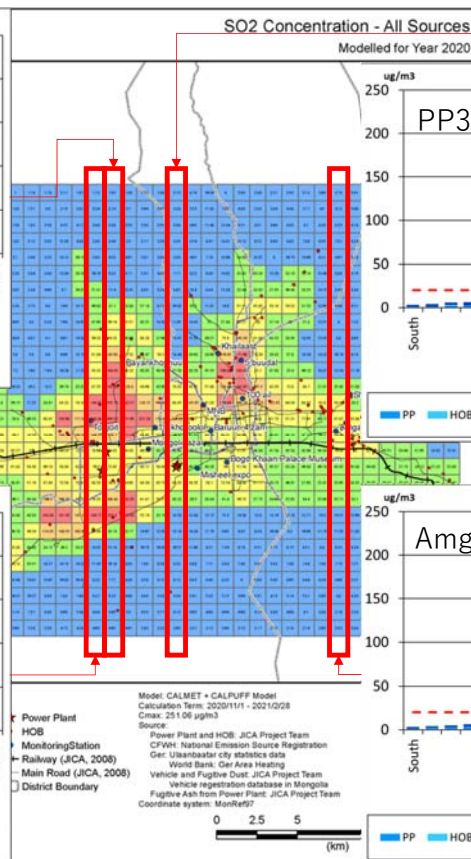
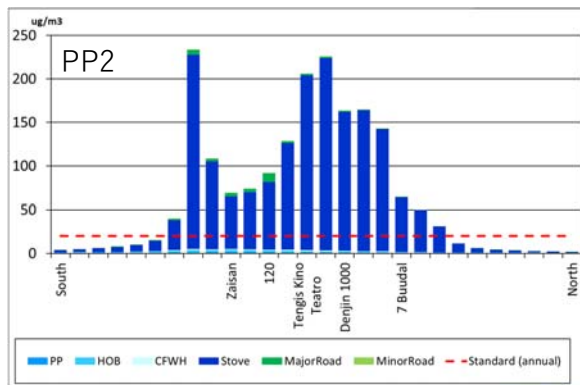


2020年



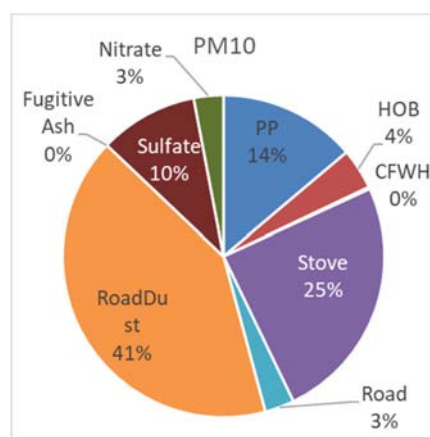
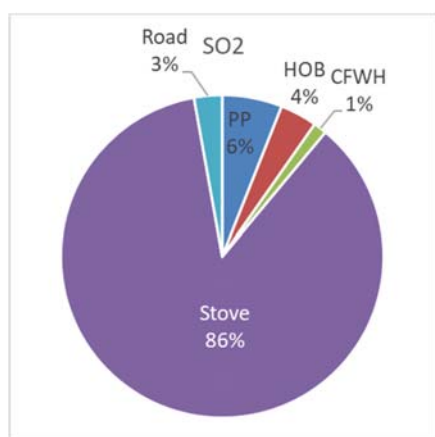
黒の縦棒：標準偏差

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計算対象範囲の発生源別濃度割合

	PP	HOB	CFWH	Stove	Road	Road Dust	PP Ash	Sulfate	Nitrate
SO ₂	6%	4%	1%	86%	3%	-	-	-	-
PM ₁₀	14%	4%	0%	25%	3%	41%	0%	10%	3%



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まとめ

- 改良燃料への転換により、家庭用小型ストーブのPM₁₀濃度が約半分に低減した一方、家庭用小型ストーブのSO₂濃度は転換前後で約3倍に増加した。
- 2018年及び2020年の測定局での濃度は、SO₂、PM₁₀いずれも大気環境基準を超過している
- 特に、家庭用小型ストーブが多く使われている市の北部と南西部で高濃度となっている。
- 改良燃料への転換は、PM₁₀濃度低減につながる対策となる。一方で、SO_x排出量及びSO₂濃度の低減のためには、硫黄分を減らすように燃料を改善することが必要である。

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Thank you for your attention!