CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)
Version 02

CONTENTS

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.

SECTION A. General description of the small-scale project activity

A.1. Title of the small-scale project activity:

Durgun hydropower project in Mongolia (The Project or Project activity)

Version ~~02~~03
Completed on ~~10~~01/~~11~~03/~~2006~~2007

A.2. Description of the small-scale project activity:

The proposed Project activity will be a 12 MW hydropower facility, which is to be constructed on the Chono Kharaih River. The facility is expected to generate an estimated 38,000 MWh of electricity per year. The electricity generated by the Project activity will be ~~to be~~ provided to Bayan Ulgii, Khovd and Uvs provinces for commercial and residential purposes. It will achieve CO_2 emission reductions of just over 28,800~~30,000~~ tCO_2/yr by displacing electricity that would otherwise be generated by a coal-fired power plant.

The Project is to be built in a narrow steep canyon of the Chono Kharaih River, 6km downstream from the Dalai-Kharus lakes. The dam consists of an earth-filled section, and a concrete section which incorporates the powerhouse, spillway and fishway. The powerhouse will accommodate 3 generating units, each with rated capacity of 4MW. The turbines are expected to operate all year round with an installed capacity of approximately 36.2%.

In addition to power generation and greenhouse gas (GHG) emission reduction, the Project will contribute to sustainable development by:

- displacing imported fossil fuel with domestic resources for power generation
- technology transfer during the construction and operation of the hydropower plant;
- preventing mass migration of local people to urban areas and degradation of remote areas.
- providing jobs and training for semi-skilled and skilled workers during and after construction;
- providing assistance in the development of potential tourist attractions;
- during the construction period, local villagers can earn additional income through selling their agricultural produce to workers;
- the incorporation of other productive water use projects such as water supply, irrigation, tourism and recreation.

A.3. Project participants:

Name of Party involved(*) ((host) indicates a host Party)	Private and/ or Public entity(ies) Project participants(*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participants (Yes/ No)

Mongolia (host)	Energy Research and Development Center (ERDC)	No
Japan	Mitsubishi UFJ Securities Co., Ltd	No
(*) In accordance with the CDM modalities and procedures, at the time of making the PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

In addition to being a project participant, Mitsubishi UFJ Securities is the CDM Advisor to the Project and the contact for the CDM Project activity.

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

A.4.1.1. Host Party(ies):

Mongolia

A.4.1.2. Region/State/Province etc.:

Khovd aimag

A.4.1.3. City/Town/Community etc:

Durgun soum

A.4.1.4. Detail of physical location, including information allowing the unique identification of this small-scale project activity(ies):

The proposed project is located 1,500 km to the west of Ulaanbaatar and 120 km to the northeast of Khovd town (the capital town of Khovd province) on the Chono Kharaih River, in the territory of the Durgun soum.

Figure 1 – Map depicting the location of the Project activity

A.4.2. Type and category(ies) and technology of the small-scale project activity:

In accordance with Appendix B of the simplified modalities and procedures for small-scale CDM project activities ("SSC M&P"), the proposed project activity falls under the following type and category:

- **Type I: Renewable energy projects**
  Category D: Renewable electricity generation for a grid (Version 09)

The Durgun Hydropower Project will consist of a 230 m long earth-filled dam and an adjacent 60 m long concrete gravity dam incorporating the powerhouse, lowlevel outlet spillway and fishway. The powerhouse will accommodate 3 generating units each consisting of a 4MW Kaplan turbine.

The units will operate under a rated head of 14.5 m and the equipment will be imported from China. The hydroplant will meet more than 90% of electricity demand of the three remote western provinces of Bayan Ulgii, Khovd and Uvs. To electricity generated by the Project activity will be dispatched to the grid (Myangad substation) by 110 kV transmission line. The length of transmission line is approximately 76 km.

~~At the same time, a~~As one of the first hydropower projects in Mongolia, it is expected that that the technologies and experiences transferred and accumulated during the engineering, construction and operation will have significant positive effects on other hydropower projects in the future.

A.4.3. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstances:

The Project activity will achieve CO_2 emission reductions by displacing electricity that would otherwise be generated by a coal-fired power plant. The total amount of GHG reduction is projected to be 28,880~~30,400~~ tCO_2e/yr or 202,160~~212,800~~ tCO_2e for the duration of the 7-year crediting period.

The Project faces barriers that impede its implementation on a BAU basis. The Project is not financially attractive with income from electricity alone. Without supplementary income from the CDM or other incentive schemes, the Project's IRR will be lower than the benchmark for similar projects in Mongolia. This hydropower project, which was identified in the 1960's, only began construction in mid 2004 after it was deemed that its emission reductions could be monetized. Evidence that the CDM was seriously considered in the decision to proceed with the project activity, is attached as appendix 1.

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:

The total estimated amount of emission reductions over the chosen crediting period of 7 years is 202,160~~212,800~~ tCO_2/yr.

Years	Annual estimation of emission reductions in tonnes of CO_2e
Year 1	28,880~~30,400~~
Year 2	28,880~~30,400~~
Year 3	28,880~~30,400~~
Year 4	28,880~~30,400~~
Year 5	28,880~~30,400~~
Year 6	28,880~~30,400~~
Year 7	28,880~~30,400~~
Total estimated reductions (tonnes of CO_2e)	202,160~~212,800~~
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	28,880~~30,400~~

A.4.4. Public funding of the small-scale project activity:

Project financing will not involve ODA or public funding from Annex I countries.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a larger project activity:

There is no registered small-scale CDM project activity or an application to register another small-scale CDM project activity in the same project category and technology/measure within 1 km of the project boundary. There is another hydropower small scale CDM project activity (Taishir Hydro Power Project)

that the project participants are preparing. However, the two projects sites are hundreds of kilometers away from each other. Therefore the Project is not a debundled component of any other larger project.

SECTION B. Application of a baseline methodology:

B.1. Title and reference of the approved baseline methodology applied to the small-scale project activity:

AMS Type I. – "Renewable Energy Projects"
Category D. Grid connected renewable energy generation (version 09)

B.2 Project category applicable to the small-scale project activity:

Category D. "Grid connected renewable energy generation" (version 09)

This category is applicable to the Project activity because it involves the construction of a renewable energy generation unit that will supply electricity to Bayan Ulgii, Khovd and Uvs provinces.

At present the electricity supplied to these provinces is made up of imports from Russia and a small amount of local generation by diesel generators. In 2002, the Mongolian Government formulated the "Mongolian Integrated Power System (MIPS) program". This program encourages electricity to be generated domestically, establishment of the Mongolian Integrated Power System and electricity imports to be reduced/eliminated. According to the Ministry of Fuel and Energy of Mongolia, in the absence of the Project activity, Bayan Ulgii, Khovd and Uvs would be supplied by a new 15MW coal-based power plant which would be constructed near the Khar Tarvagatai or Nuurst Khotgor coal deposit sites. Therefore, the Project will displace electricity that would otherwise be generated by coal-based generators in the absence of the project. Documentary evidence provided by the Ministry of Fuel and Energy of Mongolia is attached as appendix 2, which confirms that it already planned for imports from the Russian grid to Bayan Ulgii, Khovd and Uvs Provinces to be discontinued in 2007, even in the absence of the project.

In the absence of the Project activity, the only feasible options would be one of the following:

1) Install a coal-fired power plant near the provinces to supply electricity
2) Install small diesel generators in the provinces to supply electricity
3) Provide a connection from the Central Mongolian grid to the provinces.

Option 1) above is more likely during the first crediting period since according to the "Mongolian Integrated Power System", the connection from the Central grid and establishment of the Mongolian Integrated Power System is planned after 2020 as a long-term plan. Therefore, in the baseline scenario (in the absence of the Project activity) electricity would be generated by a new coal-fired power plant. Regardless, a conservative approach is adopted where the baseline emission factor is assumed to be 0.8 $kgCO_2/kWh$[1] (which is consistent with feasible option 2 above). This represents the most conservative

[1] In case of the Mongolian Central grid which generates electricity from 5 coal-based power plants, the emission factor is ~~1.04~~1.06 $kgCO_2/kWh$. Therefore using 0.8 $kgCO_2/kWh$ as the emission factor for baseline emission calculations is a conservative approach. Please refer to Appendix 3 for the Combined Margin (CM) of the Mongolian Central grid.

emission factor for diesel generator systems from Table I.D.1 in small-scale methodology I.D (version 09).

Renewable energy is to be generated by a 12MW hydropower plant, which is under the 15MW limit.

B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

There are currently no regulations in Mongolia that require the use of renewable energy sources. In the absence of the CDM, the Project activity could not be implemented due to the following insurmountable barrier:

Investment barrier

Due to high initial costs associated with planning, engineering and construction of the Project, and low revenue, the Project does not represent an attractive investment opportunity in the absence of additional revenue to that received through electricity sales. Hydropower projects in Mongolia do not receive higher tariffs or other incentives from the government so the only option for increasing revenue is to monetize GHG emission reductions through the CDM.

As can be seen from the financial data displayed below, in the absence of revenue from CERs, the Project's IRR is relatively low considering the high risk involved. Compared to the Project's IRR, which was calculated using conservative values, the benchmark for similar projects in Mongolia is likely to be much higher. In fact, according to the Mongolian Monthly Monetary Survey[2], the Mongolian Central bank's bill rate is just over 8%, which by itself (without adjusting up for risk, etc.) is higher than the Project's IRR.

Item	Value	Data source
Financial Details		
Foreign exchange rate	1,170 MNT / 1US$	Int. exchange rates
Costs for equipment and plant	26.5 mil US$	Estimate from construction company / technology providers
Electricity tariff	0.04 US$/kWh	Ministry of Fuel and Energy of Mongolia
Electricity sales	38,000,000 kWh	Estimate from engineering company
Project life	100 years	Conservative assumption
Expenses		
O&M cost/yr	191,000 US$	Estimate from project operator
Project IRR	4.98 %	

This hydropower project, which was identified in the 1960's, only began construction in mid 2004 after it was deemed that its emission reductions could be monetized through the CDM. Without the prospect of income in addition to that from the sale of electricity, this project would not have been viable.

[2] http://www.mongolbank.mn/News/MSURVE06-05-eng.pdf

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the small-scale project activity:

The physical delineation of the project boundary encompasses the physical and geographical site of the renewable generation source.

As directed in I.D., only CO_2 is accounted for when determining baseline emissions from displaced grid electricity. The Project is not responsible for any GHG emissions i.e. project emissions + leakage = 0.

B.5. Details of the baseline and its development:

The baseline study was completed on 30/08/2006 by the Clean Energy Finance Committee. The contact details of Mitsubishi UFJ Securities Co., Ltd. appear below:

Clean Energy Finance Committee
Mitsubishi UFJ Securities Co., Ltd.
Tokyo, Japan
Tel: (81-3) 6213-6860
E-mail: hatano-junji@sc.mufg.jp

The Clean Energy Finance Committee, Mitsubishi UFJ Securities Co., Ltd. is the CDM Adviser to the Project and will be the contact for the CDM activity described in this PDD.

SECTION C. Duration of the project activity / Crediting period:

C.1. Duration of the small-scale project activity:

C.1.1. Starting date of the small-scale project activity:

08/06/2004

C.1.2. Expected operational lifetime of the small-scale project activity:

100 years

C.2. Choice of crediting period and related information:

C.2.1. Renewable crediting period:

C.2.1.1. Starting date of the first crediting period:

01/11/2007

C.2.1.2. Length of the first crediting period:

7 years

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not applicable

C.2.2.2. Length:

Not applicable

SECTION D. Application of a monitoring methodology and plan:

D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

AMS Type I. – "Renewable Energy Projects"
Category D. "Grid connected renewable energy generation" (version 09)

The monitoring methodology, as defined in Appendix B of the SSC M&P for Type I.D., is applied to this project activity.

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

Choice of methodology for this small-scale project activity is Type 1, Category D (Grid connected renewable energy generation).

This category is applicable to the Project activity because it involves the construction of a renewable energy generation unit that will supply electricity to Bayan Ulgii, Khovd and Uvs provinces. Renewable energy is to be generated by a 12MW hydropower plant, which is under the 15MW limit.

D.3 Data to be monitored:

ID number	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
1	Quantitative	Electricity ~~generated~~ exported to the grid by the Project	kWh	m	Weekly	100%	Electronic	2 years after the end of the crediting period	A meter will be installed to constantly monitor~~ed~~ electricity export~~generation~~
2	Quantitative	Electricity imported from the grid	kWh	m	Weekly	100%	Electronic	2 years after the end of the crediting period	A meter will be installed to constantly monitor electricity import

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

Representatives of ERDC will collect and store relevant data in a systematic and reliable way. The data will be evaluated regularly to ensure the availability of pertinent information for verification. An electronic spreadsheet file will be kept to accumulate all monitored variables, which will be presented to the DOE for verification.

All monitoring equipments will be installed by experts and will be periodically calibrated to the highest standards by the Project staff. The monitoring of electricity export/ import and the calibration of the installed equipment will be conducted as directed in the guidelines for the "Mongolian standard MNS-50-90; 2005 and MNS 2816; 2004", of which are derived from the "Law on Guarantee of Measurement uniformity, 1994".

To cross-check the monitored electricity export, it will be compared with the records from the substation and/or grid system. For the electricity imported, the monitored amount will be compared with the receipt and/or the records from the grid system. In case of routine calibration, back-up meters, which will be periodically calibrated, will be used to monitor electricity exported/ imported or the calibration will be conducted when turbines are not operation/ the electricity is not imported, respectively.

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

The staff will be trained in the operation of all monitoring equipments and all readings will be taken under the supervision of a representative from the management. ERDC will appoint an executive to be responsible for all data monitoring/acquisition and recording for CDM purpose.

D.6. Name of person/entity determining the monitoring methodology:

The monitoring methodology was completed on 30/08/2006 by the Clean Energy Finance Committee. The contact details of Mitsubishi UFJ Securities Co., Ltd. appear below:

Clean Energy Finance Committee
Mitsubishi UFJ Securities Co., Ltd.
Tokyo, Japan
Tel: (81-3) 6213-6860
E-mail: hatano-junji@sc.mufg.jp

SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

E.1.1 Selected formulae as provided in appendix B:

Formulas are fully described below.

E.1.2 Description of formulae when not provided in appendix B:

E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

There will be no auxiliary fuel consumption in the Project activity. The electricity consumed on-site will be provided by the Project activity. If the Project plant cannot provide parasitic electricity consumption, it will be imported from the grid. However, net electricity exported, i.e., electricity exported minus electricity imported will be used for the baseline emissions calculation. Therefore there are no project emissions in the Project activity.
~~The proposed project activity is a hydro facility which does not emit GHGs. Therefore, GHG emissions due to the project activity within the project boundary, are zero.~~

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

Leakage will not occur as the Project activity does not utilize equipment which has been transferred from another activity or the existing equipment is not transferred to another activity. Therefore, as per AMS.I.D, leakage calculation is not required.

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:

Project activity emissions are zero.

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:

The electricity produced by the Project activity will displace electricity that would have been generated by a coal-fired power plant in the absence of the Project. A conservative approach is adopted where the baseline emission factor is assumed to be 0.8 $kgCO_2/kWh$ (most conservative value for diesel generators from Table I.D.1 in small-scale methodology I.D (version 9)).

The Project is expected to generate 38,000,000 kWh annually. Subtracting parasitic electricity consumption of 5%, the exported amount will be 36,100,000 kWh annually. For this PDD, the imported amount is assumed to be 0. Therefore, baseline emissions are estimated as follows:

Baseline emissions = 0.8 $kgCO_2e/kWh$ * 36,100,000~~38,000,000~~ kWh/year
= 28,880,000~~30,400,000~~ $kgCO_2e$/year
= 28,880~~30,400~~ tCO_2e/year

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

Emission reductions due to the project activity are determined as follows:

Emission reductions = Baseline emissions – (Project emissions + Leakages)

= 28,880~~30,400~~ tonnes CO_2/year – (zero(0) + zero(0))

= 28,880~~30,400~~ tonnes CO_2/year

E.2 Table providing values obtained when applying formulae above:

Year	Estimation of project activity emissions (tCO_2e) (A)	Estimation of baseline emission reductions (tCO_2e) (B)	Estimation of leakage (tCO_2e) (C)	Estimation of emission reductions (tCO_2e) (B-A-C)
Year 1	0	28,880~~30,400~~	0	28,880~~30,400~~
Year 2	0	28,880~~30,400~~	0	28,880~~30,400~~
Year 3	0	28,880~~30,400~~	0	28,880~~30,400~~
Year 4	0	28,880~~30,400~~	0	28,880~~30,400~~
Year 5	0	28,880~~30,400~~	0	28,880~~30,400~~
Year 6	0	28,880~~30,400~~	0	28,880~~30,400~~
Year 7	0	28,880~~30,400~~	0	28,880~~30,400~~
TOTAL	0	202,160~~212,800~~	0	202,160~~212,800~~

SECTION F.: Environmental impacts:

F.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

According to the "Law on Environmental Impact Assessment", an environmental impact analysis (EIA) must be conducted for hydropower projects. This task was completed for the Project by a Mongolian government authorized company, ENKO Co. Ltd. The report was completed on April 1, 2005. A short summary of the report is displayed below:

1. Implementation of the Durgun HPP project is of a crucial importance for supplying electricity to the Western region.
   However, there could be some minor negative impacts on the local eco-system, such as:
   - Deterioration of hydro-chemical and hydro-biological balances of Dalai lake and Chono Kharaih river;
   - Water level raise at Dalai lake may cause changes at the reedy marshes, wet land and meadow areas to the front side of the lake, and changes in the varieties of flora and fauna in these areas;
   - Operation of the HPP at its full capacity may cause minor flooding and formation of ice masses during the winter at the downstream areas of the dam;
   - Construction of the HPP will divide the surrounding integral environment into west and east parts. This may cause some negative impacts on the livelihoods of some fish and deep water inhabitants;

2. Though the above mentioned negative impacts on the environment may arise upon implementation of the project; these negative impacts can be reduced and prevented upon considering recommendations and instructions set out in this detailed EIA and selecting proper technological and technical solutions accordingly.

3. In order to prevent and reduce negative impacts on the environment and protect and restore the environment, it is necessary to plan a lump sum amount of 103.0 million Mongolian tugrugs and at least 18.0 million Mongolian tugrugs per annum thereafter by the project implementer and administration of the HPP operator and spend them on implementing measures and recommendations as set out by the EIA report;

4. This project can be implemented upon complying with and timely implementation of the recommendations, environmental protection and monitoring plans, as set out by this EIA, which aimed at protecting and reducing the negative impacts on the environment.

SECTION G. Stakeholders' comments:

G.1. Brief description of how comments by local stakeholders have been invited and compiled:

Before the construction of the Project, local people's opinion and comments were sought by ERDC as well as a local survey being conducted by the Dr. Ts. Urtnasan, Head of Sociology Section of Philosophy Sociology and Rights Institute of the Academy of Science. The survey was conducted by interviewing randomly selected herder and local households living nearby the Project site. As a result of the survey, 39 responses were received. Among the respondents, 36 were herder households, 2 crop farmers and 1 civil servant. Average household size was 5 persons and a total of 7 herder households' did not own any livestock; although they are aged above 23 and have their own families. Because they could not find any jobs, they were residing together with their herder parents.

G.2. Summary of the comments received:

Generally, local people showed strong interest in the construction of the Project and emphasized the importance of the Project. Followings are the examples of the opinions and comments from local people.

- Electricity supply to this soum is extremely problematic and this causes many hurdles to the normal operation of the organizations and economic entities located here. In regards to the local school, a number of problems can be listed that are associated with the shortage of electricity supply. This particularly has a negative affect on the running of the as school dormitory, computer lessons etc. Similarly, our private life is also tough. If such situation would continue longer, we plan to move to a more urbanised city or the capital city. It can be said that we are living here in anticipation that Durgun HPP will be built and make a big change to our lives. There are many persons and families like me, who are considering whether to stay or move; and we are waiting and hoping for progresses that would be brought out into the region upon constructing this HPP. (by Dulamjav, Principal of Durgun soum (village) Secondary School)

- I am living in this area from my birth and now I am 80 years old. Our winter and spring camps are located here. For many years, there were increases of the lake water surface area in some years and decreases in others. Mother-nature is very unpredictable but we were coping with it. From many years back we heard about the potential for hydropower and it was told that water surface area of the lake would increase due to dam construction here. If such increases would occur and reach our spring camp, we can move to another place. It is not such a big hurdle for us to move, as we are moving several times a year, and sometimes several times in one season. However, electricity will be the daily necessity for our livelihoods, if not for us, but for our children and grandchildren. I am just thinking of them. Certainly, it is needed to love and protect our environment; but there is difference between protecting the environment by only watching

and protecting the environment while benefiting from her resources. (by G. Dari, Herdsman of Seer bag, who resides for many years nearby the North-Dalai Lake - the upstream area of Chono Kharaikh River)

- I am working as a Watchman here since 1988. According to my observations, water level of the lake did not increased even when there were heavy rains and snow during the past years. Although in 2003 and 2004 there were very early snows, it did not affect the water level. It would be even better if the dam construction would cause water level raise of the lakes, as their water levels are decreasing. There won't be many winter and spring camps affected. (by G. Devee, Herdsman of Agbash soum and Watchman of Khar-Us Lake)

- According to my knowledge, it is told that there is an 18 m difference in the altitudes between our place or beginning of the steep narrow canyon of Chono Kharaikh River and the place of the HPP construction. It is better for us if the water levels would rise. Lake water is decreasing and for the drinking water our livestock had to travel 5-6 km in springs and summers and 10 km in winters. We are living within a circle of 14 km from here. The water level rise would not cause inconvenience for our livelihoods by relocating our autumn and winter camps etc. (by B. Ulziibaatar and S. Khash-Erdene, Herdsmen of Agralant bag, which are live to the front area of Dalai Lake)

The survey conducted by Dr. Ts. Urtnasan also showed that the local residents had positive attitudes towards constructing a HPP at the Chono Kharaikh River. Only 6 % of the respondents answered that the Project would negatively affect the environment while more than 90 % of the respondents answered that the Project would not have much affect or affect the environment at all.

The following conclusions were made based on the survey results.

1. The local residents were confident that construction of a HPP at the Chono Kharaikh River will not negatively affect the local animal husbandry, pasturelands and residential areas.
2. Herder households are looking forward to the prospect of having a reliable supply of electrcity.
3. The local residents considered that construction of a HPP will not seriously affect the natural and ecological surroundings and would not produce negative consequences (though there would be certain impacts).

G.3. Report on how due account was taken of any comments received:

Due account was taken of all comments received. The EIA considered all public comments as well as the findings of the survey of local inhabitants that was completed by Dr. Ts. Urtnasan. A number of recommendations were made in order to address concerns expressed by locals. This includes:

- Adverse impacts (as voiced by the local stakeholders) are to be avoided through appropriate planning and engineering design
- In order to prevent and reduce negative impacts on the environment and protect and restore the environment, it is necessary to plan a lump sum amount of 103.0 million Mongolian tugrugs and at least 18.0 million Mongolian tugrugs per annum thereafter by the project implementer and administration of the HPP operator and spend them on implementing measures and recommendations as set out by the EIA report

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Represented by:	
Title:	Chairman
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Project financing will not involve ODA or public funding from any Annex I countries.

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Appendix 1

INFORMATION TO DEMONSTRATE THAT THE PROJECT DEVELOPER SERIOUSLY CONSIDERED THE CDM IN ITS DECISION TO IMPLEMENT THE PROJECT

NATIONAL PROGRAM FOR RENEWABLE ENERGY[3]
/2005-2020/

One. Rationale and need for development of the Program

Based on the worldwide trend of intensive development of renewable energy, and energy demand and need of this country it is becoming imperative to widely use renewable energy for the current development of the country.

The use of renewable energy has been emphasized as one of the priority areas of the energy industry in the Government policy documents namely the Government Action Plan, Millenium Development Goals, Sustainable Development Program of Mongolia for 21st century, Regional Development Concept, Consolidated Energy System Program of Mongolia and Sustainable Energy Development Strategy of Mongolia for 2002-2010. The Government of Mongolia attaches great importance to the use of renewable energy for improving power supply through research and use of environmentally friendly and new sources of energy for the benefit of rural households who are not fully provided with power and soums and settlements that would require significant amount of resources to get connected to centralized power grids.

Two. Resources of renewable energy

Mongolia has great amount of resources of renewable energy and has favorable climatic and weather conditions for effective use of the resources.

There is a total of 3800 small and big streams and rivers which are estimated to have a potential resource of 6417.7 megawatts or 56.2 billion kilowatt/hours a year for production of energy.

In average there are 270-300 sunny days for the total territory of country and average annual daylight is estimated to be 2250-3300 hours a year. Annual sun ray per square meter is estimated to generate 1200-1600 kilowatt of energy and its intensity is more than 4.3-4.7 kilowatt per hour.

As defined in the Wind Energy Resource Map of Mongolia, there is sufficient resource of wind to be used for production of energy in 10% of the territory or in about 160 thousand square kilometers of area. It is established that 13 aimags have more than 20,000 megawatts of wind potential, and 9 aimags have more than 50,000 megawatts of wind potential, whereas Omnogobi aimag alone has wind energy potential of over 300,000 megawatts.

There are over 40 indications of deep ground heat on the territory of Mongolia and sites like Tsenjher, Khujirt and Shargaljuut, all located in the Khangai region may be used for energy purposes.

Three. Purpose of the Program

Purpose of the Program is to create conditions for ensuring ecological balance, for reducing unemployment and poverty, and for sustainable social and economic development through increasing

[3] The draft of this document was prepared in 2001 and reflected in the "Integrated Energy System Program of Mongolia, 2001".

percentage of renewable energy in the energy supply of Mongolia, improving structure of energy supply, and widely using renewable energy in provding power to rural areas.

Four. Main Objectives to be achieved Within the Program

- Creation of conditions for reliable, independent and effective operation of centralized energy grids and regional power supply systems through more use of renewable energy;

- Stage by stage implementation of the task to increase percentage of renewable energy in the production of energy so that 3-5 percent of the national energy in 2010 and 20-25 percent in 2020 is produced by renewable energy;

- Introduction of advanced technology of using renewable energy and reduction of energy system losses by not less than 3-5 percent in 2010 in comparison to current level and by 10 percent in 2020 through increasing conservation and efficiency of operations in the production, transmission, distribution and supply stages;

- Provision of power to all distant soums and settlements that would require significant amount of resources to get connected to centralized power grids, through use of renewable energy generators;

- Stage by stage implementation of sub-programs to provide schools and hospitals of soums distanced from the centralized energy grid with renewable energy sources, to widely use solar and wind energy in well water pumping and irrigation of crop growing, and creation of basic conditions for development of production based on electronic governance and knowledge in rural areas;

- Full achievement of objectives of the National Program titled "100,000 Sunny Gers" to supply renewable energy to rural households and to supply all the herder households with renewable energy generators;

- Based on detailed studies on potential resources of renewable energy of Mongolia (solar, hydro, deep ground heat, hydrogen, and biomass etc) development and implementation of Master Plan to use the energy;

- Development of feasibility studies on construction of large hydropower stations on rivers with significant hydropower resources such as Selenge, Eg and Orkhon rivers, namely Eg river 220 megawatts station, Artsat 118 megawatts station on Selenge river and Orkhon river 110 megawatts station, taking measures to implement the studies;

- Expansion of activities to add renewable energy generators to centralized power grids in urban areas of Ulaanbaatar and other cities and towns and Stage by stage increase in the percentage of renewable energy in the total supply in order to reduce air pollution in urban areas;

- Selection and study of sites with significant deep ground heat, development and implementation of feasibility study for using the sites in the supply of energy to urban areas;

- Wide application of technology and equipment to heat water and air for heating of buildings and constructions, consumption water and other purposes;

- Study and introduction of modern techniques and technologies to produce heat and power using hydrogen, fuel elements and other new sources of energy;

Five. Stages for Implementation of the Program

"The National Program for Renewable Energy (2005-2020)" shall be implemented in two stages:

- First stage for 2005-2010 /near term/
- Second stage for 2011-2020 /mid term/

5.1 Near Term Tasks:

- **Completion of constructions of Durgun and Taishir hydropower stations and ensuring independence and reliability of the Western Region power supply;**

- Commencement of construction of Orkhon river hydropower station with 100 megawatts capacity in the Central Region;

- Full achievement of objectives of the National Program titled "100,000 Sunny Gers" to supply renewable energy to rural households and to supply all the herder households with renewable energy;

- Provision of combined wind and diesel powered or wind, solar and diesel powered stations to at least 8 soum centers distant from the centralized power grids and proven to have good wind power resources and provision of combined solar and diesel powered stations to at least 5 soums ;

- Development of feasibility studies for provision of power to 16 soum centers selected for hydropower projects with building small capacity hydropower stations, and construction of hydropower stations to provide power to 8 soum centers namely, Bulgan soum of Bayan Olgii aimag, Batshireet soum of Khentii aimag, Most soum Khovd aimag, Erdenebulgan soum of Khovsgol aimag, Baruunturuun soum of Uvs aimag, Tosontsengel, Tsetsen-Uul, and Zavkhanmandal soums of Zavkhan aimag ;

- Conduct detailed study on creation of wind parks in sites such as Salkin Mountain and Khuitnii Ongotkhoi and eastern and southern regions and on connecting the parks into the centralized power grids;

- Wide application of solar heating equipment to provide consumption water to distant soum centers;

5.2 Mid Term Development Tasks:

- Completion and utilization of Orkhon river hydropower station with 100 megawatts capacity and creation of conditions for flexibility of possibilities to adjust operational regime of the central power grid and to increase its independence;

- Continuing implementation of the objective to improve provision of power to rural areas and completion of the task to deliver renewable energy generators to all distant soums and settlements that are not connected to centralized power grids (Attachment 1);

- Expansion of use of renewable energy generators to improve energy supply in rural areas and wide application of renewable energy to improve power supply to farmer stations, units of border patrol and defense forces, tourist camps and service providers;

- Construction of small and medium capacity energy complexes in Ulaanbaatar and other cities and towns to use solar, wind, hydrogen and deep ground heat, in order to reduce air pollution in the urban areas;

- Construction of medium capacity (30-50 megawatts) wind parks in in sites proven to have usable wind energy resources, connecting them to the centralized power grid and creation of conditions for their efficient operation;

- Stage by stage implementation of pilot solar power plant construction project within joint international study to create high capacity solar power plant in Gobi Region.;

Six. Policy and Measures to Support the Program

Following measures shall be taken to implement the Program:

- Inclusion and realization of funds required for implementation of the Program in the annual government centralized budget, at the same time maintaining the policy of supporting the use of long term, soft loans, technical assistance and grant provided by international financial institutions and donor countries and of private investment, and taking necessary measures to raise funds to achieve the Program objectives;

- Attachment of priority importance to and development of the use of renewable energy in order to reduce air pollution and to improve rural development, support to domestic and foreign investment in the area and improvement of legal environment to create favorable conditions for participation in the market for renewable energy by public and private sector entities and companies;

- Creation of economic leverages, price and tariff, legal and regulatory environment for fostering and supporting sales of excessive electricity to the centralized power grids by producers of energy, - business entities and organizations who use renewable energy, and by consumers who satisfy their demand for energy by renewable energy generators;

- Organization of works for development of and adherence to the standards and normative for exploitation and safety of renewable energy equipment and machinery, for their repair and maintenance to the level compatible with international standards;

- Introduction of energy service company (ESCO) activity structure for operations based on concession and/or leasing agreement in order to create conditions for efficient activity of the organizations using renewable energy generators and to improve their management;

- Systematic preparation of national specialists of renewable energy in domestic and foreign universities, and training of highly qualified technicians in developed countries;

- Inclusion in annual government centralized budget and funding of expenditures related to research, development, innovation and testing activities for purposes of studying and introducing modern and progressive achievements, techniques and technologies to use renewable energy;

- Setting up and operating scientific, technological and production parks of renewable energy in order to create conditions for extensive introduction of modern technological and scientific achievements for production, storage and transmission of energy using new energy sources such as renewable energy, hydrogen, and fuel elements;

- Expanding of bilateral and international cooperation in the area of developing activities for use of renewable energy;

Seven. Principles of Implementing the Program

The Government of Mongolia shall implement the Program through extensive involvement of international banking and financial institutions, donors, private international and domestic investors and cooperation between the government and non government organizations.

Sub-programs aimed at using renewable energy for development of education, health, and agricultural industries shall be developed and coordinated with the regional economic and social development plans.

Eight. Results to be achieved Through Implementation of the Program

Implementation of the measures included in the Program shall lead to following results:

- Completion and utilization of Orkhon river hydropower station with 100 megawatts capacity shall create conditions for a flexible adjusted operational regime of the central power grid and to improve its independence;

- Completion of constructions of Durgun and Taishir hydropower stations shall ensure independence and reliability of the Western Region power supply;

- Full achievement of objectives of the National Program titled "100,000 Sunny Gers" and provision of renewable energy generators to over 180 thousand herder households shall encourage development of household production and shall reduce the migration from countryside to urban areas;

- Completion of the task to deliver renewable energy generators to all distant soums and settlements that are not connected to centralized power grids shall result with increasing opportunities for rural inhabitants to get education and information and shall create conditions for development of production based on electronic governance and knowledge in rural areas;

- Construction of medium capacity (30-50 megawatts) wind parks in sites proven to have usable wind energy resources, and connecting them to the centralized power grid shall create conditions for their efficient and reliable operation;

- Creation of favorable legal environment for use renewable energy, for conservation of energy and for increasing the industry efficiency shall result with wide opportunities for domestic and international companies and business entities to operate in the area of renewable energy;

- Extensive use of renewable energy shall exert significant positive influence in decreasing emissions of waste greenhouse carbon dioxide and other poisonous gases into the environment due to use of traditional organic fuel (coal and oil etc.) and in reducing air pollution;

Nine. Funds and Financial Sources to Implement the Program

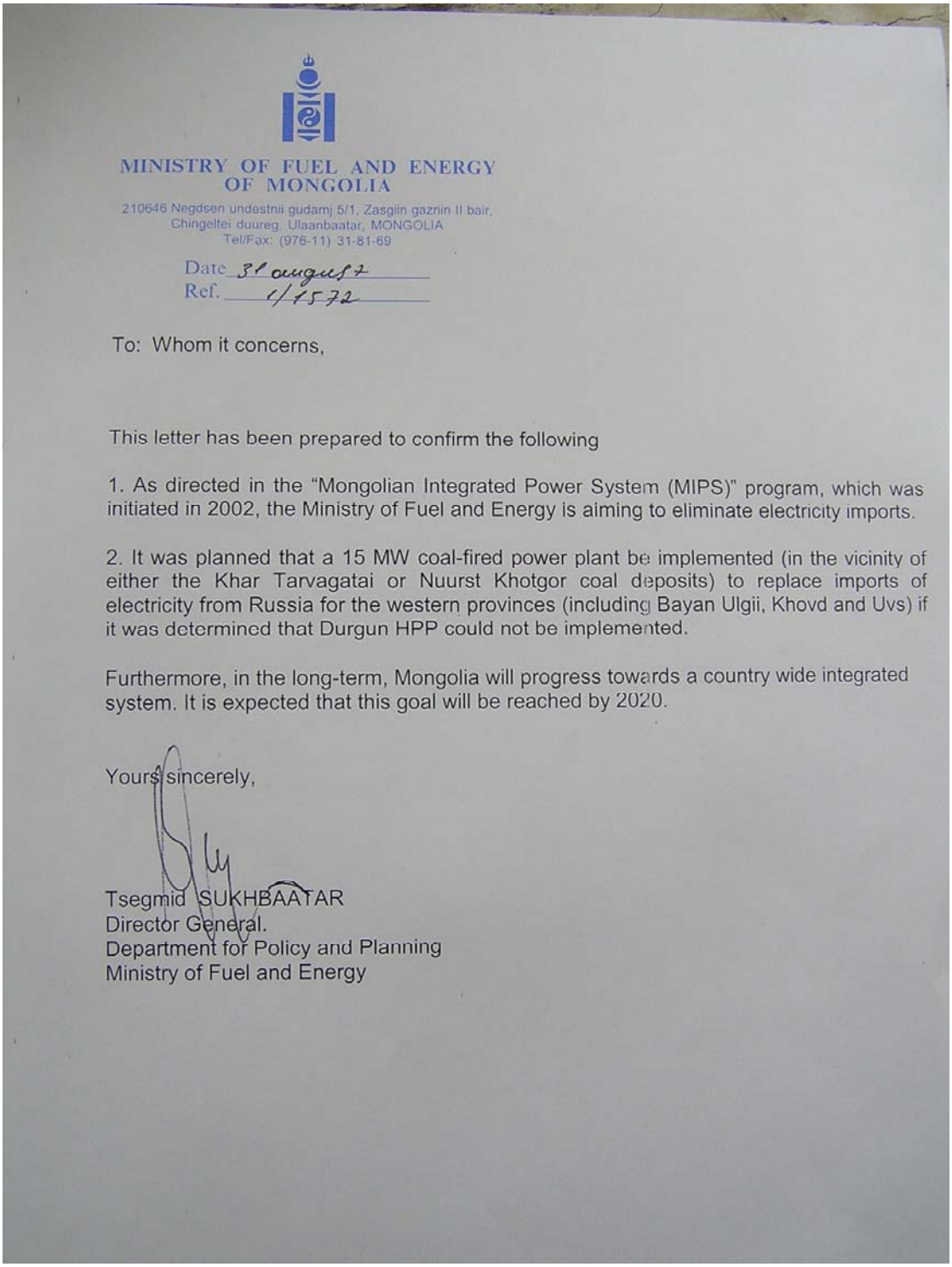
Financing the implementation of the Program shall consist of following:

- Investment from the central government budget;
- Support and assistance of international funds to support activities for use of renewable energy and new sources of energy;
- **Income to be generated from activities of using funds for clean development mechanism in order to reduce greenhouse gas emissions;**
- Private international and domestic investment;
- Soft loans an grants provided by donor countries and international organizations;

Donations and grants provided by foreign, international and domestic non government organizations;

Appendix 2

DOCUMENTARY EVIDENCE TO CONFIRM THE BASELINE SCENARIO FOR THE PROJECT ACTIVITY



MINISTRY OF FUEL AND ENERGY
OF MONGOLIA

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Date 31 august
Ref. 1/1572

To: Whom it concerns,

This letter has been prepared to confirm the following

1. As directed in the "Mongolian Integrated Power System (MIPS)" program, which was initiated in 2002, the Ministry of Fuel and Energy is aiming to eliminate electricity imports.

2. It was planned that a 15 MW coal-fired power plant be implemented (in the vicinity of either the Khar Tarvagatai or Nuurst Khotgor coal deposits) to replace imports of electricity from Russia for the western provinces (including Bayan Ulgii, Khovd and Uvs) if it was determined that Durgun HPP could not be implemented.

Furthermore, in the long-term, Mongolia will progress towards a country wide integrated system. It is expected that this goal will be reached by 2020.

Yours sincerely,

Tsegmid SUKHBAATAR
Director General.
Department for Policy and Planning
Ministry of Fuel and Energy

Appendix 3

Emission factor of the Mongolian Central Grid

Combined margin is calculated using the method described in ACM0002 (version 06). The information used in the calculation below is provided by Mongolian Government (Ministry of Fuel and Energy, Mongolia).

Operating Margin

Operating margin is calculated based on the simple OM since dispatch data is not available and low-cost/must-run resources constitute less than 50% of total grid generation. As indicated in the footnote 4 of ACM0002 (version 06), aggregated generation and fuel consumption data is used for the calculation since there is no disaggregated data for the year of 2003 and 2004.

Simple OM of Mongolian grid (2003)

Type of Fuel	Fuel consumption (kt)	Net calorific value (TJ/kt)	Electricity generated (GWh)	Fuel consumption (TJ)	Coal CEF (tC/TJ)	Oxidation factor	Grid emission (tCO_2)	Grid CEF
Coal	1199.8	29.31	3028	35166	26.2	~~0,98~~1	3,310,728	~~1,09~~1.12
Imports	-	-	131	-	-	-	0	0,00
								~~1,05~~1.07

Source: Ministry of Fuel and Energy, Mongolia

Simple OM of Mongolian grid (2004)

Type of Fuel	Fuel consumption (kt)	Net calorific value (TJ/kt)	Electricity generated (GWh)	Fuel consumption (TJ)	Coal CEF (tC/TJ)	Oxidation factor	Grid emission (tCO_2)	Grid CEF
Coal	1255	29.31	3195	36784	26.2	~~0,98~~1	3,463,047	~~1,08~~1.11
Imports	-	-	130	-	-	-	0	0,00
								~~1,04~~1.06

Source: Ministry of Fuel and Energy, Mongolia

Simple OM of Mongolian grid (2005)

Type of Fuel	Fuel consumption (kt)	Net calorific value (TJ/kt)	Electricity generated (GWh)	Fuel consumption (TJ)	Coal CEF (tC/TJ)	Oxidation factor	Grid emission (tCO_2)	Grid CEF
Coal	1231.5	29.31	3241	36095	26.2	~~0,98~~1	3,398,201	~~1,05~~1.07
Imports	-	-	130	-	-	-	0	0,00

~~1,011~~1.03

Source: Ministry of Fuel and Energy, Mongolia

Calorific value (Local data) =	7000 Kcal/kg (29.31 TJ/kt)
IPCC CEF of coal =	26.2 tC/TJ (sub. bit. Coal)
IPCC Oxid fact =	~~0,98~~1

Source for calorific value: Ministry of Fuel and Energy, Mongolia

Build Margin

There are only 5 coal-based power plants in the grid. Therefore, all of the 5 plants are included in the build margin calculation.

BM of the Mongolian grid (2005 data)								
Plant name	Fuel consumption	Net calorific value	Electricity generated	Fuel consumption	Coal CEF	Oxidation factor	Grid emission	Plant CEF
	(kt)	(TJ/kt)	(GWh)	(TJ)	(tC/TJ)		(tCO_2)	(tCO_2/MWh)
TPP 2	70,703	29,~~,~~31	108	2,~~,~~072	26,~~,~~2	~~0,98~~1	195,~~,~~098	1,~~,~~8~~40~~
TPP 3	249,868	29,~~,~~31	563,~~,~~4	7,~~,~~324	26,~~,~~2	~~0,98~~1	689,~~,~~486	1,~~,~~2~~52~~
TPP 4	767,244	29,~~,~~31	2195,~~,~~45	22,~~,~~488	26,~~,~~2	~~0,98~~1	2,~~,~~117,~~,~~133	0,~~,~~9~~86~~
Darkhan TPP	98,648	29,~~,~~31	238,~~,~~8	2,~~,~~891	26,~~,~~2	~~0,98~~1	272,~~,~~209	1,~~,~~1~~64~~
Erdenet TPP	45,057	29,~~,~~31	137	1,~~,~~321	26,~~,~~2	~~0,98~~1	124,~~,~~330	0,~~,~~9~~31~~
			3,~~,~~243				3,~~,~~398,~~,~~256	1,~~,~~0~~75~~

Source: Ministry of Fuel and Energy, Mongolia

Combined Margin

OM	~~1,03~~1.05	(weight of 0.5)
BM	~~1,05~~1.07	(weight of 0.5)
CM	~~1,04~~1.06	tCO2/MWh