Joint Crediting Mechanism Project Design Document Form

A. Project description

A.1. Title of the JCM project

10MW-scale Solar Power Generation for Stable Power Supply

A.2. General description of project and applied technologies and/or measures

The proposed JCM project aims to construct a 10MW-scale solar power generation plant in Altai City, Gobi-Altai aimag. The plant will be connected to the Altai-Uliastai Regional Energy System, and will provide sustainable supply of electricity to the region in order to deal with increasing electricity demand due to mine development. The project contributes to reduction of GHG emission by replacing electricity generated from existing thermal power plants, which utilize fossil fuels including coal and diesel.

A.3. Location of project, including coordinates

Country	Mongolia
Region/State/Province etc.:	Gobi-Altai aimag
City/Town/Community etc:	Altai City
Latitude, longitude	N46° 23.163’ E96° 12.653’

A.4. Name of project participants

Mongolia	● Joint venture of Unigas LLC and counterparts (financed by SAISAN Co., Ltd and myclimate Japan Co., Ltd)
Japan	● SAISAN Co., Ltd ● myclimate Japan Co., Ltd

A.5. Duration

Starting date of project operation	October 2016
Expected operational lifetime of project	20 years

A.6. Contribution from developed countries

Contribution from Japan is as follows.

1. Introduction of Japanese technology

The technology of solar power generation, in which Japan is globally competitive, is introduced in the project. In order to assist sustainable development of solar power generation in Mongolia, technology transfer is conducted through training seminar. This

training seminar includes inspection on solar power plants in Japan and information exchange with related Japanese governmental entities.

2. Financial support from Japan

Financial support for the project is provided by Japanese entities, including project participants, Japanese banks and through the JCM financing program.

The abovementioned contribution from Japan intends to improve energy supply in Mongolia to a more sustainable one, as well as to deal with air pollution caused by coal burning in thermal power plants and households. Apart from the improvement of air quality, cost effect such as job creation is also expected.

B. Application of an approved methodology(ies)

B.1. Selection of methodology(ies)

Selected approved methodology No.	
Version number	

B.2. Explanation of how the project meets eligibility criteria of the approved methodology

Eligibility criteria	Descriptions specified in the methodology	Project information
Criterion 1	The project activity is generation of mega-solar scale power (more than or equal to 1MW output) in Mongolia.	In this project, a 10MW-scale solar power generation system will be installed in Gobi-Altai aimag, Mongolia. Therefore, the project meets this criterion.
Criterion 2	The project activity is the installation of a new solar power generation system at a site where there has been no mega-solar scale power generation system, or capacity addition to the existing solar power generation system.	In this project, a new solar power system will be newly installed at a site where no solar power system has existed previously. Therefore, the project meets this criterion.
Criterion 3	The electricity generated by the project will be supplied to Altai-Uliastai Regional Energy System in Mongolia to replace existing electricity generation.	In this project, the electricity generated will be supplied to Altai-Uliastai Regional Energy System in Mongolia to replace electricity generated by existing thermal power plants. Also, auxiliary

	Auxiliary electricity consumption by the project, if there is any, will be supplied from Altai-Uliastai Energy System.	electricity consumption by the project is supplied from Altai-Uliastai Energy System. Therefore, the project meets this criterion.
Criterion 4	The solar power generation system installed in the project measures net electricity supplied to the grid.	In this project, net electricity supplied to the grid is measured. Therefore, the project meets this criterion.
Criterion 5	The solar cells in the system have obtained: (i) a certification of design qualifications and safety qualification set by the IEC (International Electrotechnical Commission), and/or (ii) have obtained any other national certifications that are fully conform with the IEC. The qualifications set by the IEC referred are as follows: - Design qualification and type approval: IEC 61215 (silicon) , IEC 61646 (thin-film) , and IEC 62108 (CPV) - Safety qualification: IEC 61730-1 (construction) and IEC 61730-2 (testing)	In this project, the solar cells have obtained design qualification (IEC 61215) and safety qualification for construction (IEC 61730). Therefore, the project meets this criterion.
Criterion 6	The solar power generation system installed in the project includes power conditioner(s) with minimum conversion efficiency of 98%.	In this project, power conditioners with conversion efficiency of 98.6% is installed. Therefore, the project meets this criterion.
Criterion 7	The solar power generation system installed in the project is equipped with remote monitoring system. The remote monitoring system emits warning in the event of operation failure, etc. The project	In this project, a remote monitoring system is installed. Therefore, the project meets this criterion.

	owner/participant located in the distance receives warning remotely and can quickly attend to the issues for trouble-shooting and recovery.	

C. Calculation of emission reductions

C.1. All emission sources and their associated greenhouse gases relevant to the JCM project

Reference emissions	
Emission sources	GHG type
CO_2 emissions from electricity generation in fossil fuel intensive grid electricity system that are displaced due to project activity.	CO_2
Project emissions	
Emission sources	GHG type
CO_2 emissions from electricity consumption from the grid on site due to project activity.	CO_2

C.2. Figure of all emission sources and monitoring points relevant to the JCM project

Reference scenario is displacement of electricity in the grid by renewable energy generated by the project. Reference emissions will be calculated by the product of amount of electricity supplied to the grid and the emission factor of the grid. Fig. 1 shows electrical connection diagram of PV plant, with monitoring point indicated in red.

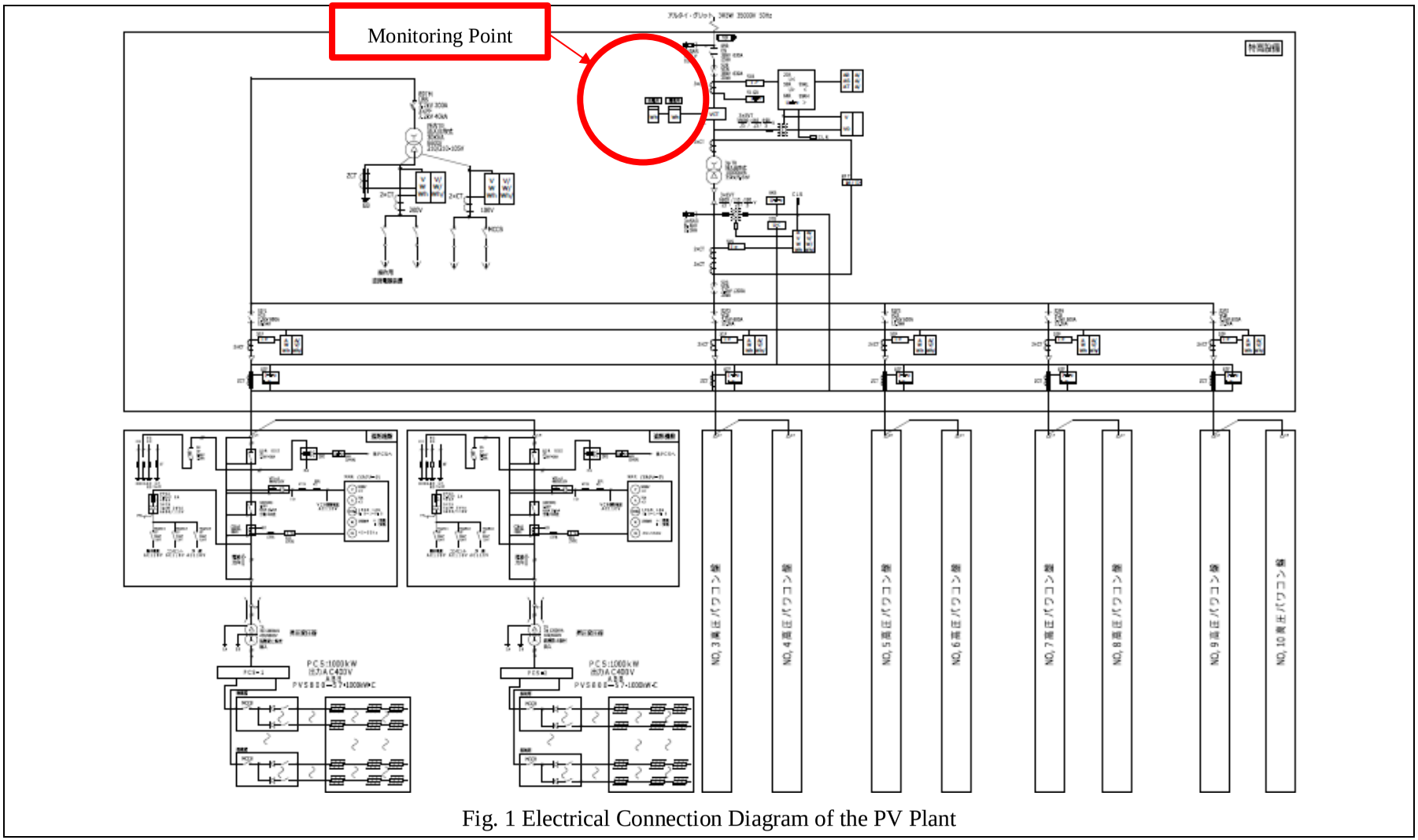

Fig. 1 Electrical Connection Diagram of the PV Plant

C.3. Estimated emissions reductions in each year

Year	Estimated Reference emissions (tCO_2)	Estimated Project Emissions (tCO_2)	Estimated Emission Reductions (tCO_2)
2014	0	0	0
2015	0	0	0
2016	6,364	21	6,343
2017	12,728	41	12,687
2018	12,728	41	12,687
2019	12,728	41	12,687
2020	12,728	41	12,687
Total (tCO_2)	57,276	185	57,091

D. Environmental impact assessment	
Legal requirement of environmental impact assessment for the proposed project	Yes

E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

Local stakeholders of the project and the need of consultation are as follows.

1. **Local residents**

   Local residents who are likely to be affected by the construction of the project. Since this project is located far from residential areas, it is concluded that the construction of the project will not affect the local residents. In addition, the implementation plan of the project has been shared to the local residents during a local council meeting, as summarized in the "Altai Aimag" section below. Hence, consultation of local residents is not necessary.

2. **Altai Airport**

   Local facility which is located next to the project site. A hearing survey is conducted with the head of local land authority (which is under the jurisdiction of Altai Aimag), and comments are summarized in the "Altai Aimag" section below.

3. **Altai-Uliastai Regional Energy System**

   Local administrator and counterpart of grid connection of the project. A hearing survey is conducted with the president of the company, and comments are summarized in the "Altai-Uliastai Regional Energy System" section below.

4. Altai Aimag Local administrator in charge of the aimag where the project site is located. A hearing survey is conducted with the governor and deputy governors, and comments are summarized in the "Altai Aimag" section below. **5. Ministry of Energy** Central bureaucracy in charge of power generation businesses. Since the implementation of this project is specifically requested by the Ministry of Energy, full support is provided by the Ministry.

E.2. Summary of comments received and their consideration

Stakeholders	Comments received	Consideration of comments received
Altai Aimag	(Comments from Mr. Batsaikhan D. and Mr. Chinzorig D., deputy governors of Altai aimag) ● There are various challenges in Altai aimag regarding power supply, including (1) insufficient power supply from Taishir hydropower plant due to water shortage, (2) instability in power imported from Russia through Western Energy System (import amount is decided based on the discretion of Russian government), (3) difficulties in securing diesel fuel for diesel power plants. Such restrictions in power supply are one of the factors causing delay in the economic development of Altai aimag. The implementation of this project is favorable to the aimag. Therefore, Altai aimag will provide full support for the realization of the project. ● Local residents have been informed of the implementation plan of the project during a local council meeting.	No action is needed.
	(Comments from head of local land authority of Altai aimag) ● (In response to possible effects on flights to and from Altai Airport which are caused by the project, including sunlight reflection on solar	No action is needed.

	panels) The project site is located more than 500m from Altai Airport. Therefore, there are no significant concerns on the location of the project in relation to the airport.	
	(Comments from Mr. Amgalanbaatar, governor of Altai aimag) ● It is requested that the project site is relocated from Taishir (location determined during JCM Feasibility Study in the previous year) to Aitai City. Altai City is cheaper in terms of maintenance cost of the project, due to its relatively convenient location. Also, construction of the project near Altai City aids in the promotion of the image of the city.	The project site is relocated from Taishir to Altai City.
Altai-Uliastai Regional Energy System	(Comments from Mr. Chinbat, president of Altai-Uliastai Regional Energy System) ● Altai-Uliastai Regional Energy System (AUES) supports those with assurances on the realization of their project. The project participants has continued visiting Altai aimag this year, as promised during JCM Feasibility Study in the previous year. Therefore, AUES firmly trusts the participants. ● In the future, electricity demand in Altai City is expected to increase due to mines and factory development. However, planned electricity supply remains low at 6MW. The implementation of this project will not only aid in reducing the amount of electricity purchased from CES and WES, but also supplement the shortage of electricity supply by Taishir hydropower plant.	No action is needed.

F. References

- Law of Mongolia on Renewable Energy (2007)
- Law on Environmental Impact Assessment (2012)

Reference lists to support descriptions in the PDD, if any.

Annex

1. Calculation of Reference Emissions

$$RE_p = EG_{REF,p} \times EF_{CO2,grid,p}$$

Parameter	Description
RE_p	Reference emissions in period p (tCO_2/p)
$EG_{REF,p}$	Amount of net electricity supplied by the project to the grid (MWh/p)
$EF_{CO2,grid,p}$	Emission factor of the grid electricity displaced by the project (tCO_2/MWh)

2. Calculation of Project Emissions

$$PE_p = EC_{AUX,p} \times EF_{CO2,grid,p}$$

Parameter	Description
PE_p	Project emissions in period p (tCO_2/p)
$EC_{AUX,p}$	Amount of the grid electricity consumed by the project (MWh/p)
$EF_{CO2,grid,p}$	Emission factor of the grid electricity consumed by the project (tCO_2/MWh)

3. Calculation of Emission Reduction

$$ER_p = RE_p - PE_p$$

Parameter	Description
ER_p	Emission Reduction in period p (tCO_2/p)
RE_p	Reference emissions in period p (tCO_2/p)
PE_p	Project emissions in period p (tCO_2/p)

Revision history of PDD

Version	Date	Contents revised