

Promoting Bilateral Mechanisms in Asia and the Pacific A Workshop on the Joint Crediting Mechanism

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10MW SOLAR PHOTOVOLTAIC PLANT IN DARKHAN CITY (JOINT CREDIT MECHANISM PROJECT)

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1. About JCM

- 2. Project Structure and Details
- 3. Technical Details of the Project
- 4. Power Generation Estimates
- 5. Calculation of the Emission Reductions
- 6. Conclusion







About the JCM – Basic Concept

A governmental supporting scheme aiming to facilitate the diffusion of low carbon technologies and products from Japan to contribute to the sustainable development of developing countries.



The Japanese government will grant financial support up to 50% of total project cost to relevant JCM projects and in turn, gain 50% of the CO_2 credits from the project.

JCM Partner countries: Mongolia, Bangladesh, Ethiopia, Kenya, Maldives, Viet Nam, Laos, Indonesia, Costa Rica, Palau, Cambodia, Mexico, Saudi Arabia, Thailand and Philippines.







The Darkhan PV 10MW PV Project



Shigemitsu Sh

Project Summary

Capacity10MWdc (~30 hectares)Site/ Access10 min drive from Darkhan City, beside Darkhan 220/110/35kV Substation 260km North of Ulaanbaatar city-Capital of Mongolia 3-4 hours by car from Ulaanbaatar city-Capital of Mongolia	etc.)	
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	etc.)	
Sharp(1) Supply of equipments (PV modules, mounting structures, inverters, combiner boxes, (2) System design (3) Technical Advice, Project Supervision (Test running etc.) and Commissioning PV plant		
 SPI Scope of Work ① Obtaining necessary permits, licenses (project development) ② PV plant installation and construction work 	 Obtaining necessary permits, licenses (project development) PV plant installation and construction work 	
 Shigemitsu Soji Project Financing Expected date of Commissioning is by December 2016 		
 Timeframe Subsidy application completed on Jul 2016. Project completion by Dec 2016 		
Grid 110kV, Central Energy System (connected to Russia) PV plant will be connected into 220/110/35kV Substation which is 70m from PV plant	site	
PPA rateEnergy Regulatory Agency has approved Feed-in Tariff is USD 0.165/kWh, 25 years.PPA ratePayment will be done in MNT, but will refer to the USD/MNT exchange rate at the time the payment.	of	







The Darkhan 10MW PV Project Technical Summary

Project name	Darkhan 10MW PV Plant
Type of PV Module	Multicrystalline Si, SHARP, 310Wp
PV Plant Output Power, kWp	10,004,940kWp
Annual Power Generation,	14,367,296kWp
Internal Power Consumption (daytime)	126,848kWh/year
Internal Power Consumption (Night time)	258,699kWh/year





SHARP

Global Solar radiation map at tilted angle 45° degree







Estimated Annual Power Generation







SHÅRP

Estimated Power Generation for 20 years







SHARP

Reference emissions are calculated by the following formula:

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

where

- **RE**_p Reference Emission (tCO₂/year)
- **EG**_{PE,P} Amount of Electricity Generation (MWh/year)
- EF_{grid} Rgrid Emission factor in given year (tCO₂/MWh)





Project emissions are calculated by the following formula:

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

where

- **PE**_p Project Emissions (tCO₂/year)
- **EG**_{AUX,p} Auxiliary power consumption(MWh/year)
- Ef_{grid} Grid Emission factor in given year (tCO₂/MWh)





Calculation of Emission Reductions

Emissions Reduction are calculated by the following formula:

$$ER_p = RE_p - PE_p$$

where

- **ER**_p Emissions reductions (tCO₂/year)
- \mathbf{RE}_{p} Reference emission (tCO₂/year)
- **RE**_p Project emission (tCO₂/year)





Estimated amount of Net Electricity Generation: 13,910.476 MWh/year (Electricity Generation-Grid Electricity Consumption)

Grid emission factor : 1.0601 tonCO₂/MWh

Estimated amount of Emission Reduction is:

 $13,910.476 \times 1.065 = 14,746 \operatorname{tonCO}_2/\operatorname{year}$





Conclusion

- 1. 1st Mega-scale-grid-connected PV plant in Mongolia and also 1st JSM applied PV project
- The estimated amount of annual production is 14,367 MWh/year
- Estimated amount of Emission Reduction is: 14,746 tonCO₂/year
- Estimated payback time is ~ 9 years and project is feasible







THANK YOU FOR YOUR ATTENTION

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