PROJECT DEPARTMENT
NEW DELHI MUNICIPAL COUNCIL
PALIKA KENDRA NEW DELHI
Phone No.41501383, Extn.No.2701

CORRIGENDUM

Name of work:- REQUEST FOR PROPOSAL (HEREINAFTER REFERRED TO AS RFP) FOR BIDDING PROCEDURE THROUGH TARIFF BASED COMPETITIVE BIDDING FOR THE DEVELOPMENT OF ROOFTOP SOLAR POWER PROJECTS OF 4 MW IN NEW DELHI MUNICIPALITY AREA AND THE PROCUREMENT OF ELECTRICITY GENERATED WHEREFROM BY NDMC IN THE STATE OF DELHI

Current Date	Amended Date
Bid submission and opening of Bid Friday, 10 Oct 2014	Bid submission and opening of Bid Friday, 17 Oct 2014

Note:-New terms & condition may kindly be noted as atteched

Sd/-

Director (Project)

REVISED

REQUEST FOR PROPOSAL (HEREINAFTER REFERRED TO AS RFP) FOR BIDDING PROCEDURE THROUGH TARIFF BASED COMPETITIVE BIDDING FOR THE DEVELOPMENT OF ROOFTOP SOLAR POWER PROJECTS OF 4 MW IN NEW DELHI MUNICIPALITY AREA AND THE PROCUREMENT OF ELECTRICITY GENERATED WHEREFROM BY NDMC IN THE STATE OF DELHI.

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NEW DELHI MUNICIPAL COUNCIL

PALIKA KENDRA : SANSAD MARG

NEW DELHI - 110001

PABX No. 011-41501354-60

Issued by:

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Designation: Director - Projects
Address: Room No. 7008, Pallika Kendra Building
Parliament Street, New Delhi – 110001

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Date: 16st July, 2014

REQUEST FOR PROPOSAL
NOTIFICATION INVITING TENDERS (NIT)
FOR ROOFTOP SOLAR POWER PROJECT

1. The New Delhi Municipal Council hereby invites interested companies thereof ("**Bidders**") to bid for the Request for Proposal ("**RFP"**) to participate in the bidding process for the selection of a Selected Bidder for development of rooftop solar PV power projects ("**Projects**") and procurement by **NDMC**, (hereinafter also referred as "**Procurer**") of power generated by such Project for 25 years through competitive bidding process. The responsibility of each of the Selected Bidder(s) would be to develop Projects on Government Buildings located in New Delhi Municipal Area and supply power to Procurer as per the terms and conditions of the RFP Documents.
2. **Bidding Process:** The NDMC seeks to qualify and select a Bidder for the development of Projects in New Delhi and supply of power as aforesaid through this bidding process. For the purpose of selection of the Selected Bidder(s), Bidders shall be required to submit both Non-Financial Bid and Financial Bid simultaneously in a TWO bid process as per the timelines mentioned in para 8 of this notification. Bidders who meet the Qualification Requirement as specified in the RFP will be Qualified Bidders and the Financial Bids of all such Qualified Bidders shall be opened and evaluated as per provisions of the RFP for the purpose of selection of Selected Bidder(s). .
3. **Procurement of power:** Procurer intends to procure power from the multiple Projects to be delivered at the Interconnection Point for a period of years from the Scheduled Commercial Operation Date in accordance with the terms of the Relevant PPA 15.
4. **Commencement of supply of power:** The Selected Bidder(s) shall have to commence the supply of power on the Scheduled Commercial Operation Date in accordance with the provisions of the Relevant PPA.
5. **Tariff:** NDMC will sign a PPA to procure the Power generated as quoted in financial bid .
6. **Documents**: For the benefit of the prospective Bidders, the NDMC has collected certain information and documents relevant to the Projects. Bidders can collect the information from NDMC office directly.
7. **Receipt and Opening of Bid:** Bid must be delivered to the address mentioned above on or before 1700 hours (IST) on 10th **October 2014** (last date of submission of Bid) and the Bids will be opened on the same day at 1800 hours (IST), in the presence of Bidder's representatives who wish to attend. If it is a public holiday on the last date for submission of the Bid, the submission and the receipt of the Bid shall be on the next working day at the place of submission of Bid, on which day the Bid received shall be opened. Note that the bid date and time may be amended in accordance with the RFP and any such amendment shall be notified to the recipients of the bid documents.
8. **Nodal Person for enquiries and clarifications** All correspondence, clarifications in respect of the RFP and submission of the Bid shall be addressed to:

Name: Mr O.P Mishra
Designation: Director - Projects
Address: Room No. 7008, Palika Kendra Building
Parliament Street, New Delhi – 110001
Phone: +011-41501383
Email: mishraop@hotmail.com

Date: **2 4 S e p t** , 2014

9. All capitalized terms/words and expressions used in this notification but not defined herein shall have the same meaning as ascribed to them in the RFP.

DISCLAIMER

1. The information contained in this RFP or subsequently provided to Bidder(s), whether verbally or in documentary or in any other form by or on behalf of NDMC or the Government of Delhi or any of their employees or advisors, is provided to Bidder(s) on the terms and conditions set out in this RFP and such other terms and conditions subject to which such information is provided.

2. This RFP is not an agreement and is neither an offer nor invitation by NDMC to the prospective Bidders or any other party. The purpose of this RFP is to provide interested parties with information that may be useful to them in making their Bid. This RFP includes statements, which reflect various assumptions and assessments arrived at by NDMC in relation to the Project. Such assumptions, assessments and statements do not purport to contain all the information that each Bidder may require. This RFP may not be appropriate for all persons, and it is not possible for the Authority, their employees or advisors to consider the investment objectives, financial situation and particular needs of each party who reads or uses this RFP. The assumptions, assessments, statements and information contained in this RFP may not be complete, accurate, adequate or correct. Each Bidder should, therefore, conduct its own investigations and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions, assessments, statements and information contained in this RFP and obtain independent advice from appropriate sources.

3. Information provided in this RFP to the Bidder(s) is on a wide range of matters, some of which depends upon interpretation of law. The information given is not an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. NDMC accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed herein.

4. The Authority, its employees and advisors make no representation or warranty and shall have no liability to any person including any Bidder under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this RFP or otherwise including the accuracy, adequacy, correctness, completeness or reliability of the RFP and any assessment, assumption, statement or information contained therein or deemed to form part of this RFP or arising in any way in this Bid stage.

5. NDMC also accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Bidder upon the statements contained in this RFP.

6. NDMC may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in this RFP.

7. The issue of this RFP does not imply that NDMC is bound to select a Bidder or to appoint a sponsor or concessionaire, as the case may be, for the Project and

NDMC reserves the right to reject all or any of the Bidders or Bids or discontinue or cancel the bidding process without assigning any reason whatsoever.

8. The Bidder shall bear all its costs associated with or relating to the preparation and submission of its Bid including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by NDMC or any other costs incurred in connection with or relating to its Bid. All such costs and expenses will remain with the Bidder and NDMC shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by a Bidder in preparation or submission of the Bid, regardless of the conduct or outcome of the Bidding Process.

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DEFINITIONS

Any capitalized term, used but not defined in the RFP, shall have the meaning ascribed to such term in the RFP Documents. In absence of availability of definitions in the foregoing references, the capitalized terms shall be interpreted in accordance with the Electricity Act 2003, the CERC (Terms and Conditions of Tariff) Regulations 2009, the Grid Code or any other relevant electricity law, rule or regulation prevalent in India, as amended or re-enacted from time to time, in that order. **The following terms are defined for use in the RFP:**

"Affiliate" shall mean a company that either directly or indirectly

i. controls or
ii. is controlled by or
iii. is under common control with a Bidding Company (in the case of a single company) or a Member (in the case of a Consortium) and "**control**" means ownership by one company of at least fifty one percent (51%) of the voting rights of the other company. As an illustration of a chart is annexed hereto as Format 5.10;

"Appropriate Commission" shall mean the New Delhi Electricity Regulatory Commission and the Central Electricity Regulatory Commission set up under the Electricity Act 2003;

"Bid" shall mean the Non-Financial Bid and the Financial Bid(s) submitted by the Bidder, in response to the RFP, in accordance with the terms and conditions hereof;

"Bid Deadline" shall mean the last date and time for submission of Bid in response to the RFP as specified in the RFP as may have been extended in accordance with the RFP;

"Bidding Company" shall refer to such single company that has submitted the Bid in accordance with the provisions of the RFP;

"Bid Evaluator" or "NDMC" shall mean New Delhi Municipal Council, including its successors and permitted assigns;

"**Bid Validity**" shall have the meaning ascribed to it in Clause 2.9.1;

"**Commercial Operation Date**" shall have the meaning ascribed to it in the Relevant PPA;

"Conflict of Interest" A Bidder may be considered to be in a Conflict of Interest with one or more Bidders in the same bidding process under the RFP if they have a relationship with each other, directly or indirectly through a common company, that puts them in a position to have access to information about or influence the Bid of another Bidder;

"Consents, Clearances and Permits" shall mean all authorizations, licenses, approvals, registrations,

permits, waivers, privileges, acknowledgements, agreements, or concessions required to be obtained from or provided by any concerned authority for the purpose of setting up of the generation facilities or supply of power;

"**Contract Period**" shall have the meaning ascribed to it in Clause 1.3.1;

"Contract Year" shall mean the period beginning on the Commercial Operation Date and ending on the immediately succeeding March 31 and thereafter each period of 12 months beginning on April 1 and ending on March 31 provided that the last Contract Year shall end on the last day of the term of the Relevant PPA or the date of its early termination, whichever is earlier;

"Development Security" means the Performance bank guarantee from a nati onali z ed b an k/ scheduled commercial bank in India to be provided by the Selected Bidder or the Project Company (as the case may be) to NDMC pursuant to Clause 2.13

"Electricity" means the electrical energy in kilowatt hours;

"Electricity Act 2003" shall mean the Electricity Act, 2003 and any rules, amendments, regulation, notifications, guidelines or policies issued there under from time to time;

"Financial Bid" shall mean for each Project, Envelope II of the Bid, containing the Bidder's Quoted Tariff as per the Format 4.10 of the RFP for such Project;

"**Financial Criteria"** means the criteria specified in Clause 2.1.2.1;

"Financially Evaluated Entity" shall mean the Financial Member that has been evaluated for the satisfaction of the Financial Criteria;

"Financial Member" shall have the meaning set out in Clause 2.1.3;

"**NDMC**" shall mean New Delhi Municipal Council, which has been nominated by the Government of Delhi to enter into the Project Implementation Agreement with the Solar Company to implement the Projects;

"Interconnection Points" shall for each Project mean the points where the power from each of the rooftop PV power generation installation of the Solar Company is injected into the distribution system of Procurer and will be mutually agreed by Solar Company and Procurer based on the interconnection scheme annexed to Schedule 8 of the Relevant PPA;

"Law" shall mean (i) any law of Republic of India or (ii) unless otherwise specified, the law of any other applicable jurisdiction, in each case including all orders, rules, regulations, executive orders, decrees, policies, judicial decisions (including writ, injunction, decree or award), determinations or awards, notifications, or directives made pursuant thereto, issued or, (in case of treaties) entered into by a Statutory Entity, applicable to this RFP and the exercise, performance and discharge of the respective rights and obligations of the relevant parties hereunder, as may be in force and effect during the subsistence of this Agreement and as each may be amended or supplemented from time to time;;

"Letter of Intent" or **"LOI"** shall mean the letter to be issued by NDMC to the Selected Bidder(s) for supply of power pursuant to Clause 3.5 of the RFP;

"Networth Company" shall have the meaning set out in Clause 2.1.5

"Non Financial Bid" shall mean Envelope I of the Bid containing the documents as specified in Clause 2.4.1.1 of the RFP

"PPA" shall mean for each Project the agreement to be entered into between Procurer and the Solar Company pursuant to which the Solar Company shall supply power to Procurer.

"Procurer" shall mean NDMC, including its successors and permitted assigns;

"Project Company" shall mean the company, incorporated by the Bidder as per Indian laws

"**Project Implementation Agreement"** shall mean the agreement of that name to be entered into between the Solar Company and NDMC in the form attached as Format 5.5 Enclosure 2;

"Qualification Requirements" shall mean the qualification requirements as set forth in Clause 2.1 of the RFP

"Qualified Bidder(s)" shall mean the Bidder(s) who, after evaluation of their Non Financial Bid as per Clauses 3.2 and 3.3, are declared by the NDMC as qualified for opening and evaluation of their Financial Bid;

"Relevant PPA" shall mean the PPA for each of the two Projects respectively, as relevant;

"Relevant Building" shall mean government buildings located in the city of New Delhi Municipal Area, New Delhi, owned by government on which Selected Bidder or Project Company (as applicable) for the purpose of developing the Project awarded to it. An indicative list of buildings with areas, location and tentative solar capacity details has been enclosed as an Annexure. 1;

"RFP" shall mean this Request for Proposal dated 18th July 2014 along with all formats and RFP Documents attached hereto and shall include any modifications, amendments alterations or clarifications thereto;

"RFP Documents" shall mean the documents and agreements to be entered into by the parties to the respective agreements in connection with the project along with the PPA

"Scheduled Commercial Operation Date" or "SCOD" shall have the meaning ascribed to it in the Relevant PPA

"Selected Bidder" shall mean with respect to each of the Projects the Bidder selected by the NDMC pursuant to the RFP for implementing the project for supply of power from the Project by itself or through the Project Company as per the terms of the RFP Documents, and to whom a Letter of Intent has been issued;

"Solar Company" shall mean with respect to each of the Projects, the Selected Bidder/or the Project Company, as the case may be, who submits the Development Security/ Performance Guarantee and

executes the Relevant PPA with Procurer and other RFP Documents with NDMC and the rooftop

owners, and who shall be responsible for supplying power to Procurer at the Interconnection Points for the term of the Relevant PPA as per the terms and conditions specified therein;

"Statutory Auditor" shall mean the auditor of a company appointed under the provisions of the Companies Act, 1956 or under the provisions of any other applicable governing law;

"Technical Criteria" shall mean the criteria set out in Clause 2.1.2.2;

"Technically Evaluated Entity" shall mean the entity that has been evaluated for the satisfaction of the Technical Criteria; and

"Tie Bidder" shall have the meaning ascribed to it in Clause 3.5.4;

"Tariff" Tariff quoted by the bidder must be levellized flat tariff for 25 Years

SECTION - 1

INTRODUCTION

INTRODUCTION
SECTION 1

1.1 NDMC hereby invites interested Bidders to participate in the bidding process for the selection of a Selected Bidder for the development multiple Solar Rooftop Projects and procurement of power for 25 years through competitive bidding process.

1.2 The NDMC proposes to select the Bidder(s) having the prescribed qualifications and whose Quoted Tariff determined to be the Lowest as per the provisions of Clause 3.5 to become the Solar Company in respect award of the project. The Selected Bidder shall enter into the Project Implementation Agreement with NMDC to develop multiple Projects across NDMC area of Delhi. The Solar Company shall supply power to NDMC from such Project pursuant to and as per the terms and conditions of the Relevant PPA to be signed between Procurer and Solar Company.

1.3 Power Procurement

1.3.1 Scope

Brief scope of power procurement is given as under:

The successful bidders will develop Solar Rooftop Projects in NDMC area on 25 Years lease term basis, generate solar power using the roof & inject the same into Mutually agreed interconnection points as quoted by Bidder .

Sr. No	Scope	Details
1.	Contract Period (in years)	25 years.
2.	Project Capacity (MW)	Capacity ranging from of 100 KWp to 1MWp on each individual roof for solar PV power generation.
3.	Maximum Bid Capacity	4 MW
4	Minimum Bid Capacity	1 MW
4.	Scheduled Commercial Operation Dates	31 Jan 2015 from Issue of LOI.
5.	Interconnection Point	Means the point of injection of the power from each of the rooftop installations comprising the Project which shall be mutually agreed by the Solar Company and Procurer based on the interconnection scheme annexed to the Relevant PPA.
6.	Arranging Interconnection Facility	The NDMC will arrange the Interconnection Facilities at its own cost and as per the specifications provided in the Relevant PPA.

1.3.2 Details of Procurer containing the following information may be accessed from NDMC Last three years of the available audited accounts

SECTION - 2

INFORMATION AND INSTRUCTIONS FOR BIDDERS

SECTION -2

2. INFORMATION AND INSTRUCTIONS FOR BIDDERS

2.1 Qualification Requirements

2.1.1 The Bidder should be a corporate entity duly incorporated under the relevant laws of its jurisdiction. The Bidder must meet all the Qualification Requirements.

2.1.2 The Bidder must fulfill the following Qualification Requirements specified in Clause 2.1.2.1 and 2.1.2.2:

2.1.2.1 **Financial Criteria:** Networth o f B i dd er should be equal to or greater than **Rs. 2 5 Crore or equivalent USD.** *[Calculated as per provisions mentioned in Note below]*. The computation of networth shall be based on unconsolidated audited annual accounts of most recent financial year preceding the Bid Deadline.

[**Note:** For the Qualification Requirements, if data is provided by the Bidders in foreign currency, equivalent rupees of Networth will be calculated using bills selling exchange rates (card rate) USD / INR of State Bank of India prevailing on the date of closing of the accounts for the respective financial year as certified by the Bidders' banker.

For currency other than USD, Bidders shall convert such currency into USD as per the exchange rates certified by their banker prevailing on the relevant date and used for such conversion.

If the exchange rate for any of the above dates is not available, the rate for the immediately available previous day shall be taken into account.]

Networth shall be computed in the following manner by the Bidder: For the purposes of meeting financial requirements, only unconsolidated audited annual accounts shall be used. However, audited consolidated annual accounts of the Bidding Company or Member, as the case may be, may be used for the purpose of financial requirements provided the Bidding Company or Member, as the case may be, has at least twenty six percent (26%) equity in each Networth Company whose accounts are merged in the audited consolidated accounts and provided further that the financial capability of such Networth Companies (of which accounts are being merged in the consolidated accounts) shall not be considered again for the purpose of evaluation of the Bid.

Networth	
=	Paid up share capital
Add:	Reserves
Subtract:	Revaluation Reserves
Subtract:	Intangible Assets
Subtract:	Miscellaneous Expenditures to the extent not written off and Carry forward losses

Bidders shall furnish documentary evidence as per the Format 4.6 (A), duly certified by its Statutory Auditor in support of their financial capability.

2.1.2.2 Technical Criteria:

The Bidder must fulfill the following minimum technical requirements specified in A ,B ,C and D

A. The Bidder or its subsidiary or its affiliate company must have experience of installation of solar photovoltaic power projects of at least 18 MW capacity as a developer t or as an EPC Player and project shall be operation for last one year..

B. The Bidder or its subsidiary or its affiliate company must have experience of executing PPA base rooftop solar power projects above 90 kWp capacity in last 3 Financial years from the date of opening of price bid

C. Net Worth of Bidder Company should be 25 Cr. or above.

D. Average 3 Year Turnover of Bidder should be 100 Cr or above.

Consortium is not allowed to participate in Bidding process.

2.1.5 The Bidder may seek qualification on the basis of technical capability of its Subsidiary Company for the purpose of meeting the Qualification Requirements**.**

The determination of the relationship of Subsidiary Company with the Bidding Company shall be as existing on the date seven (7) days prior to the Bid Deadline. Documentary evidence in form of a certification from a practicing Company Secretary or Statutory Auditor to establish such relationship shall be furnished by the Bidder along with the Bid.

2.1.6 A Bidder shall submit only one response to the RFP either individually as Bidding Company

2.1.7 Notwithstanding anything stated above, the NDMC reserves the right to verify the authenticity of the documents submitted for meeting the Qualification Requirements and may request for any additional information / documents. The NDMC reserves the right at its sole discretion to contact the Bidder's bank, lenders, financing institutions and any other persons as necessary to verify the Bidder's information/documents for the purpose of qualification.

2.1.8 (a) If at any stage of the bidding process, any order / ruling is found to have been passed in the last one (1) year preceding the Bid Deadline by an Appropriate Commission or a competent court of Law against any Bidder or its Affiliates for its material breach of any contract for supply of power having duration of contract in excess of one (1) year to any licensee in India, Bids from such Bidders shall be liable to be rejected.

2.2 Submission of Bid by the Bidder

2.2.1 The information and/or documents shall be submitted by the Bidder as per the formats specified in Section 4 (Formats for RFP) of this document.

2.2.2 The Bidding Company should designate one person to represent the Bidding Company in its dealings with the NDMC. The person should be authorized to perform all tasks including, but not limited to providing information, responding to enquiries, signing of Bid etc. The Bidding

Company should submit, along with Bid, a Power of Attorney in original (as per Format 4.2 (a)), authorizing the signatory of the Bid.

2.2.6 **Clarifications**

2.2.6.1 The NDMC will not enter into any correspondence with the Bidders, except to furnish clarifications on the RFP and RFP Documents, if necessary. The Bidders may seek clarifications on the RFP and RFP Documents in writing, through a letter or by fax (and also soft copy by e-mail) to reach the NDMC at the address, date and time mentioned in Clause 2.8. For the avoidance of any doubt, it is hereby clarified that there shall be no extension in the Bid Deadline on account of clarifications sought in accordance with this Clause 2.2.6.

2.2.6.2 NDMC is not under any obligation to entertain / respond to suggestions made or to incorporate modifications sought for.

2.2.7 The draft of the PPA have been attached as per Format 5.5 Enclosure -1;

The RFP Documents shall be signed in required number of originals so as to ensure that one original is retained by each party to the agreement(s).

2.2.8 **Payment of Project Development Fee, Performance Guarantee and Development Fee**

(a) Within thirty (30) days of the issue of the Letter of Intent for each Project, the Selected Bidder/ Project Company, as the case may be, shall:

(i) provide a valid Performance Guarantee as per the provisions of Clause 2.12 of the RFP; and thereafter

(ii) execute the Relevant PPA in required number of originals so as to ensure that one original is retained by each party to the agreement.

Provided that, if for any reason attributable to Procurer or NDMC the Performance Guarantee is not provided by the Selected Bidder(s)/ Project Company within the above period of thirty (30) days of the issue of Letter of Intent as mentioned in this Clause, such period of thirty (30) days shall be extended, on a day for day basis till the end of the Bid validity period.

2.2.9 The cost of all stamp duties payable for executing the RFP Documents shall be borne by the Selected Bidder.

2.2.10 If the Selected Bidder(s) fails or refuses to comply with any of its obligations under Clauses 2.2.9, and provided that Procurer(s) and / or other parties to the respective RFP Documents are willing to execute the said documents, such failure or refusal on the part of the Selected Bidder/ Project Company shall constitute sufficient grounds for cancellation of the Letter of Intent.

2.3 Amendment of RFP

2.3.1 In case bidder need any further clarifications not involving any amendments in respect of the final RFP and RFP Documents, they should ensure that written request for such clarification is delivered to Procurer / NDMC at least fifteen (10) days prior to the Bid Deadline as mentioned in Clause 2.8, the NDMC may issue clarifications only, at its sole discretion, which is considered reasonable by it. Any such clarification issued shall be sent to all the Bidders to whom the RFP has been issued. Clarifications sought after this date shall not be considered in any manner and shall be deemed not to have been received. There shall be no extension in Bid Deadline on account of clarifications sought as per this Clause.

2.4 Bidding Process

2.4.1 Bid Formats

2.4.1.1 The Bid in response to the RFP shall be submitted by the Bidders in the manner provided in Clause 2.10. The Bid shall comprise of the following:

(A) Envelope I – Non- Financial Bid comprising of:

i. Covering Letter as per prescribed Format 4.1

ii. Original power of attorney issued by the Bidding Company, in favor of the authorized person signing the Bid, in the form attached hereto as Format 4.2.

Provided that in the event the Bidding Company is a foreign entity, it may submit Board resolutions in place of Power of Attorney for the purpose of fulfilling the above requirements;

Provided further that such Board resolutions, as specified above, in case of a foreign entity, shall be supported by an unqualified opinion issued by the legal counsel of such foreign entity, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid. In the case of a foreign entity, in the event, any and/or all of the documents/resolutions are in any other language other than English, then a duly notarized copy of such translation shall also be required to be submitted.

iii. Details for meeting Qualification Requirement as per the prescribed format along with documentary evidence for the same as specified in Clause 2.1;

iv. Bidders' Undertaking as per the prescribed Format 4.7 (A)

v. Board Resolution of the Financially Evaluated Entity of the Bidding Company as per prescribed format, duly certified by the Company Secretary or the Managing Director undertaking to provide the entire Development Security/ Performance Guarantee in the event of failure of the Bidding Company; or

Board Resolution of the Parent or Ultimate Parent of the Financially Evaluated Entity referred to above, as per prescribed Format 4.8, duly certified by the Company Secretary or the Managing Director undertaking to provide the entire Development Security/ Performance Guarantee in the event of failure of the Bidding Company / Member of the Consortium to do so.

Provided that such Board resolutions, as specified above, in case of a foreign entity, shall be supported by an unqualified opinion issued by the legal counsel of such foreign entity, stating that the board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid.

vi. Checklist for Bid submission requirements as prescribed in Format 4.10;

vii. Disclosure as per Format 4.11 regarding participation of any related companies in this bidding process;

viii. Initialed RFP Documents as per format;

ix. 25 Year Energy Generation Report using PV SYT V 6.25 and Meteonorm V 7.1.2.15160 for NDMC region in Delhi.

(B) Envelope II – Financial Bid as per Format 4.10.

Bidding Parameter: The bidding parameter is the Tariff. The Bidder shall inter-alia take into account the following while preparing and submitting the Financial Bid as per the prescribed Format 4.9, duly signed by an authorized signatory.

- The Bidder shall submit their Tariff and shall specify the same in its Financial Bid as prescribed in Format 4.10 of the RFP.

- The Financial Bid will comprise of only one part: Flat Tariff for 25 Years

2.5 The Bidder should note that:

(a) If any Bidder conceals any material information or makes a wrong statement or misrepresents facts or makes a misleading statement in its Bid, in any manner whatsoever in order to create circumstances for the acceptance of its Bid, the NDMC reserves the right to reject such Bid or cancel the Letter of Intent, if issued. If such event is discovered after the date of signing the RFP Documents, consequences specified in the relevant RFP Document shall apply.

(b) If for any reason the Bid of any Selected Bidder is rejected or Letter of Intent issued to such Selected Bidder is cancelled, Procurer/ NDMC may:

i. Consider the next lowest Financial Bid from Bidders other than the Selected Bidder(s) whose Bids are responsive and valid; or
ii. Annul the bid process; or
iii. Take any such measure as may be deemed fit in the sole discretion of Procurer/ NDMC, as applicable'

(c) Bid submitted by the Bidders, within the Bid Deadline, shall become the property of the NDMC and shall not be returned to Bidders

(d) Language of the Bid shall be English only;

(e) Bidders shall mention the name of the contact person and complete address of the Bidder in the covering letter as per Format 4.1;

(f) The NDMC may, at its sole discretion, ask for additional information/ document and/ or seek clarifications from a Bidder after the Bid Deadline, inter alia, for the purposes of removal of inconsistencies or infirmities in its Bid. However, no change in the substance of the Quoted Tariff shall be sought or permitted by Procurer/ NDMC;

(g) Failure by the NDMC to require information from a Bidder that has not been properly provided shall not be construed as waiver on the part of the NDMC of the obligation of the Bidder to furnish the said data / information unless the waiver is in writing;

(h) The NDMC may verify the Bidder's financial data by checking with the Bidder's lenders / bankers / financing institutions / any other person as necessary;

(i) The Bidders shall satisfy themselves, on receipt of the RFP, that the RFP is complete in all respects. Intimation of any discrepancy shall be given to the NDMC at the address provided in Para 9 of the notification to the RFP immediately. If no intimation is received from any Bidder within ten (10) days from the date of issue of the RFP or from the date on which it was made available in the virtual dataroom for the Project it shall be considered that the issued document, complete in all respects, has been received by the Bidder; and

(j) The RFP document includes statements, which reflect the various assumptions arrived at by the NDMC in order to give a reflection of the current status in the RFP. These assumptions may not be entirely relied upon by the Bidders in making their own assessments. The RFP does not purport to contain all the information each Bidder may require and may not be appropriate for all persons. Each Bidder should conduct its own investigations and analysis and should check the accuracy, reliability and completeness of the information in the RFP and obtain independent advice from appropriate sources.

2.6 Bidder to inform itself fully

2.6.1 The Bidder shall make independent enquiry and satisfy itself with respect to all the required information, inputs and circumstances and factors that may have any effect on its Bid. Once the Bidder has submitted the Bid, the Bidder shall be deemed to have examined the laws and regulations in force in India, the grid conditions, and fixed its price taking into account all such relevant conditions and also the risks, contingencies and other circumstances which may influence or affect the supply of power. Accordingly, the Bidder acknowledges that, on being selected as Selected Bidder, it shall not be relieved from any of its obligations under the RFP Documents nor shall be entitled to any extension of time for commencement of supply or financial compensation for any reason whatsoever.

2.6.2 The Bidders should particularly acquaint themselves with the technical requirements of integrated grid operation as specified in the, the Delhi Grid Code and the Delhi Distribution Code.

2.6.3 In their own interest, the Bidders are requested to familiarize themselves with the Electricity Act, 2003, the Income Tax Act 1961, the Companies Act, 1956, the Customs Act, the Foreign Exchange Management Act 1999, the Environment Protection Act 1986 and Forest (Conservation) Act 1980, the local laws affecting use of rooftop for solar PV installations the regulations framed by regulatory commissions and all other related acts, laws, rules and regulations prevalent in India, as amended from time to time. Procurer/ NDMC shall not entertain any request for clarifications from the Bidders regarding the same. Non-awareness of these laws or such information shall not be a reason for the Bidder to request for extension in Bid Deadline. The Bidder undertakes and agrees that, before submission of its Bid; all such factors as generally stated above, have been fully investigated and considered while submitting the Bid.

2.6.4 The Bidder shall familiarize itself with the procedures and time frames required to obtain all Consents, Clearances and Permits required for the supply of power to Procurer. Procurer shall have no liability to obtain any of the Consents, Clearances and Permits required for setting up of the generation facilities and/ or supply of power.

2.7 Deleted

.

2.8 Due Dates

2.8.1 The Bidders should submit the Bids so as to reach the address specified below by 1700 hrs (IST) on 10 October 2014 at the following address:

Mr O.P Mishra
Director - Projects
Room No. 7008, Pallika Kendra Building
Parliament Street, New Delhi – 110001

2.8.2 The following shall be the time schedule for completion of the bidding process

Event	**Schedule**
Date of Issue of RFP	Wednesday , 24 Sep 2014
Bid submission and opening of Bid	Friday, 17 Oct 2014
Shortlisting of Selected Bidders (s) and issue of Letter of Indent	Monday,20 Oct 2014
Receiving consent on LOI	Thursday 26 Oct.2014

The timelines are indicative may be changed as per discretion of NDMC

2.9 Validity of the Bid

2.9.1 The Bidder shall submit the Bid which shall remain valid up to one hundred and twenty (120) days after the Bid Deadline (**"Bid Validity"**). NDMC reserve the right to reject any Bid which does not meet the aforementioned validity requirement

2.9.2 NDMC may solicit the Bidders' consent for an extension of the period of validity of the Bid. The request and the response in this regard shall be in writing. In the event any Bidder refuses to extend its Bid validity as requested by the NDMC, the NDMC shall not be entitled to invoke the Bid Bond. A Bidder accepting the NDMC's request for validity extension shall not be permitted to modify its Bid and such Bidder shall, accordingly, extend the validity of the Bid Bond as requested by the NDMC within seven (7) days of such request, failing which the Bid shall not be considered as valid.

2.10 Method of Submission

2.10.1 Bids are to be submitted in a single closed cover envelope (as mentioned in Clause 2.10.2) containing Envelope I (Non-Financial Bid) and Envelope II (Financial Bid) each one duly closed separately. Envelope I (Non-Financial Bid) and Envelope II (Financial Bid) should be transcript in the following way;

Envelope I (Non-Financial Bid) superscript –

“Bid for selection of Solar Company for procurement of solar power from rooftops”

Name of the Bidder ……..

Due for opening on .....

Envelope II: “Financial Bid”

Envelope II (Financial Bid) for Project -
[“Financial Bid for selection of Solar Company for procurement of solar power from rooftop Projects]

Name of the Bidder .....

Due for opening on: .....

Envelope II: “Financial Bid”

2.10.2 Envelope I (Non-Financial Bid) and Envelope II (Financial Bid) (mentioned in Clause 2.10.1) for the Bid to be submitted by Bidders should be packed in a single closed cover envelope, with the following superscript:

[“Bid for selection of Solar Company for procurement of solar power from rooftops”]

Due for opening on

Attention: Director - Projects
Room No. 7008, Pallika Kendra Building
Parliament Street, New Delhi – 110001

“Name of the Bidder ……”

2.10.3 The Bidders have the option of sending their Bid either by registered post; or speed post; or courier; or by hand delivery, so as to reach NDMC by the Bid Deadline. Bids submitted by telex / telegram / fax / e-mail shall not be considered under any circumstances. NDMC shall not be responsible for any delay in receipt of the Bid. Any Bid received after the Bid Deadline shall be returned unopened.

2.10.4 It may be noted that Non-Financial Bid (Envelope I) shall not contain any information/document relating to Financial Bid. If Non-Financial Bid contains any such information / documents, Procurer/ NDMC shall not be responsible for premature opening of the Financial Bid.

2.10.5 All pages of the Bid, except for the Bid Bond (Format 4.9), and any other document executed on non-judicial stamp paper, forming part of the Bid and corrections in the Bid, if any, must be signed by the authorized signatory on behalf of the Bidder. It is clarified that the same authorized signatory shall sign all pages of the Bid. However, any published document submitted with the Bid shall be signed by the authorized signatory at least on the first and last page of such document.

2.10.6 Bidders shall submit the Bid one (1) original plus (2) copies, duly signed by the authorized signatory of the Bidder. The original Bid shall be clearly marked "ORIGINAL", and all other copies are to be clearly marked "COPY OF BID". In the event of any discrepancy between the original and the accompanying copies, only the original shall prevail.

2.10.7If the outer cover envelope or Envelope I (Non-Financial Bid) or Envelope II (Financial Bid) is not closed and not transcript as per the specified requirement, Procurer/ NDMC will assume no responsibility for the Bid's misplacement or premature opening.

2.11 Preparation Cost

The Bidder shall be responsible for all the costs associated with the preparation of the Bid and participation in discussions and attending Pre-bid meetings, and finalization and execution of the RFP Documents, etc., Procurer/ NDMC shall not be responsible in any way for such costs, regardless of the conduct or outcome of this Bid process.

2.12 Performance Guarantee

2.12.1 Within thirty (30) days of issue of Letter of Intent, the Selected Bidder(s) either on his/their own behalf or on behalf of the Solar Company, shall provide to Procurer, the Performance Guarantee of Rs. 30.00 lakh/MW (Rupees thirty lacs) against Performance Ratio of minimum 70% in the first year as prescribed in Format

2.12.2 Non submission of the Performance Guarantee or the Development Security by the Selected Bidder(s) as per the provisions of Clause 2.13 may lead to the invocation of the Bid Bond, cancellation of the Letter of Intent of such Selected Bidder(s) by the NDMC, and thereafter, the provisions of Clause 2.5 (b) shall be applicable.

2.13 Right to withdraw the RFP and to reject any Bid

2.13.1 The RFP may be withdrawn or cancelled by the NDMC at any time without assigning any reasons thereof. The NDMC and the Government of New Delhi further reserve the right, at their complete discretion, to reject any or all of the Bids without assigning any reasons whatsoever and without incurring any liability on any account.

2.14 The NDMC reserve the right to interpret the Bid submitted by the Bidder in accordance with the provisions of the RFP and make its own judgment regarding the interpretation of the same. In this regard the NDMC shall have no liability towards any Bidder and no Bidder shall have any recourse to the NDMC with respect to the selection process. The NDMC shall evaluate the Bids using the evaluation process specified in Section 3, at its sole discretion. The NDMC's decision in this regard shall be final and binding on the Bidders.

2.15 Confidentiality

2.15.1 The parties undertake to hold in confidence the RFP and RFP Documents and not to disclose the terms and conditions of the transaction contemplated hereby to third parties, except:

a) to their professional advisors;
b) to their officers, contractors, employees, agents or representatives, financiers, who need to have access to such information for the proper performance of their activities;
c) disclosures required under applicable Law, without the prior written consent of the other parties of the concerned agreements.

Provided that the Selected Bidder(s) agrees and acknowledges that any of Procurers may at any time, disclose the terms and conditions of the RFP and RFP Documents to any person, to the extent stipulated under the applicable Law or the Bidding Guidelines.

2.16 Fraudulent and Corrupt Practices

2.16.1 The Bidders and their respective officers, employees, agents and advisers shall observe the highest standard of ethics during the Bid process and subsequent to the issue of the Letter of Intent. Notwithstanding anything to the contrary contained herein, or in the Letter of Intent, the NDMC shall reject a Bid, withdraw the Letter of Intent, as the case may be, without being liable in any manner whatsoever to the Bidder, if it determines that the Bidder has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice in the Bid process.

2.16.2 Without prejudice to the rights of the NDMC under Clause 2.16.1 hereinabove and the rights and remedies which the NDMC may have under the Letter of Intent, if a Bidder is found by the NDMC to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice during the Bid process, or after the issue of the Letter of Intent, such Bidder shall not be eligible to participate in any tender or RFP issued by the NDMC, during a period of two (2) years from the date such Bidder is found by the NDMC to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practices, as the case may be**.**

SECTION - 3

EVALUATION CRITERIA

SECTION 3

3. EVALUATION CRITERIA

3.1 Bid Evaluation The evaluation process comprises the following four steps.

Step I – Qualification check of Technical

Step II – Evaluation of Bidder's fulfillment of Qualification Requirements as per Clause 2.1

Step III - Evaluation of Financial Bid

Step IV – Selected Bidder(s) selection

3.2 STEP I – Responsiveness check of Technical Bid

The Technical Bid submitted by Bidders shall be scrutinized to establish responsiveness to the requirements laid down in the RFP. Subject to Clause 2.5(g), any of the following may cause the Bid to be considered "Non-responsive", at the sole discretion of Procurer / NDMC:

Bids that are incomplete, i.e. not accompanied by any of the applicable formats inter alia covering letter, power of attorney supported by a board resolution as per Clause 2.4.1.1, applicable board resolutions, applicable undertakings, format for disclosure, valid Bid Bond;

Bid not signed by authorized signatory and / or stamped in the manner indicated in the RFP;

Material inconsistencies in the information / documents submitted by the Bidder, affecting the Qualification Requirements;

Information not submitted in the formats specified in the RFP;

Bid validity being less than that required as per Clause 2.9 of

the RFP; Bid being conditional in nature;

Bid not received by the Bid Deadline;

Bid having Conflict of Interest;

Bidder delaying in submission of additional information or clarifications sought by NDMC as applicable;

Bidder makes any misrepresentation as specified in Clause

2.5; Energy Production Chart for 25 Years for NDMC region

Each Bid shall be checked for compliance with the submission requirements set forth in the RFP

before the evaluation of Bidder's fulfilment of Qualification Requirement is taken up. Format 4.10 shall be used to check whether each Bidder meets the stipulated requirements.

3.3 STEP II– Evaluation of Bidder's fulfilment of Qualification Requirements

3.3.1 Evaluation of Bidder's Qualification will be carried out based on the information furnished by the Bidder as per the prescribed Format 4.6 and related documentary evidence in support of meeting the Qualification Requirements as specified in Clause 2.1. Non-availability of information and related documentary evidence for the satisfaction of Qualification Requirements may cause the Bid to be non-responsive. However, NDMC may seek further clarification, information and document from any Bidder as it may deem necessary. The Bidders shall be required to respond to any such request of the NDMC within the time permitted by NDMC for submission of such clarifications, information and documents. If any Bidder fails, refuses or avoids submission of any such clarification, information or documents within the permitted time, then such Bidders' Bid shall be evaluated in absence of such information and the NDMC shall not be responsible of any consequence thereof, including the rejection of the Bid.

3.3.2 The NDMC shall declare the Bidders that have qualified so that their Financial Bids can be opened.

Step III - Evaluation of Financial Bid

3.4.1 Financial Bids (Envelope II) of the Qualified Bidders shall be opened in presence of the representatives of such Qualified Bidders, who wish to be present. The evaluation of Financial Bid shall be carried out based on the information furnished in Envelope II (Financial Bid).

3.4.2 The Financial Bids submitted by the Bidders shall be scrutinized to ensure conformity with the provisions of Clause 2.4.1.1 (B) of the RFP. Any Bid not meeting any of the requirements as per Clause 2.4.1.1 (B) of the RFP may cause the Bid to be considered "Non-responsive" at the sole decision of the NDMC.

Financial Bids of the Bidders submitting a Bid for both the Projects shall be evaluated separately for each of the Projects.

3.5 STEP IV – Selected Bidder(s) Selection

3.5.1 Bids qualifying in Step III shall only be evaluated in this stage.

3.5.2 The Quoted Tariff from the Financial Bids for each of the Project of all Qualified Bidders shall be ranked from the lowest to the highest.

3.5.3 Subject to Clause 3.6 the Bidder with the Lowest Quoted Tarifft for a Project shall be declared as the Selected Bidder for that Project.

3.5.4 In the event that two or more Bidders bid the same Quoted Tariff for a Project (the "**Tie Bidders**"), the NDMC shall identify the Selected Bidder based on the Networth of the Tie Bidders. Accordingly, out of the Tie Bidders, the Bidder whose Networth is highest shall be the Selected Bidder.

3.5.5 The Letter(s) of Intent shall be issued to a Selected Bidder for each Project selected as per the provisions of this Clause 3.5.

3.5.6 There shall be no negotiation on the Quoted Tariff between the NDMC and the Bidder(s) during the process of evaluation.

3.5.7 Each Selected Bidder shall unconditionally accept the Letter of Intent, and record on one (1) copy

of the Letter of Intent, “Accepted Unconditionally”, under the signature of the authorized signatory of the Selected Bidder and return such copy to the NDMC within seven (7) days of issue of Letter of Intent.

SECTION - 4

FORMATS FOR

BID SUBMISSION

4.1 Format of Covering Letter

(The covering letter should be on the Letter Head of the Bidding Company/ Lead Member of the Bidding Consortium)

Date: _____ From : _____(Insert name and address of Bidding Company)

Tel.#: Fax#: E-mail address#

To:

Attention: Director - Projects
Room No. 7008, Pallika Kendra Building
Parliament Street, New Delhi – 110001

Sub: **Bid for supply of power on long term basis through Tariff based competitive bidding process for rooftop solar PV project in New Delhi in response to RFP dated ……. *[Insert date in dd/mm/yyyy].***

Dear Sir,

We, the undersigned ……. *[insert name of the „Bidder"]* having read, examined and understood in detail the RFP and RFP Documents for development of the Projects in New Delhi and supply of power on long term basis throughTariff based competitive bidding process for meeting the requirements of Procurer hereby submit our Bid, comprising of Financial Bid(s) and Non-Financial Bid. We confirm that neither we nor any of our Parent Company/ Subsidiary / Ultimate Parent Company has submitted Bid other than this Bid directly or indirectly in response to the aforesaid RFP.

1 We give our unconditional acceptance to the RFP, dated …….. *[Insert date in dd/mm/yyyy]* and RFP Documents attached thereto, issued by the NDMC, as amended. In token of our acceptance to the RFP Documents, the same have been initialed by us and enclosed to the Bid. We shall ensure that the Solar Company shall execute such RFP Documents as per the provisions of the RFP and provisions of such RFP Documents shall be binding on us.

2. We have submitted our Financial Bid strictly as per Format 4.10 of the RFP, without any deviations, conditions and without mentioning any assumptions or notes for the Financial Bid in the said format.

3. **Acceptance**

We hereby unconditionally and irrevocably agree and accept that the decision made by the NDMC in respect of any matter regarding or arising out of the RFP shall be binding on us. We hereby expressly waive any and all claims in respect of Bid process.

We confirm that there are no litigations or disputes against us, which materially affect our ability to fulfill our obligations with regard to supply of power.

4. **Familiarity with Relevant Indian Laws & Regulations**

We confirm that we have studied the provisions of the relevant Indian laws and regulations as required to enable us to submit this Bid and execute the RFP Documents, in the event of our selection as Selected Bidder. We further undertake and agree that all such factors as mentioned in Clause 2.6 of the RFP have been fully examined and considered while submitting the Bid.

5. **Contact Person**

Details of the contact person are furnished as under: Name : ……

Designation : ……..

Company : ……

Address : ……

Phone Nos. : ……

Fax Nos.:…… E-mail address: ……..

7. We are enclosing herewith the Non Financial Bid (Envelope I) and separate Financial Bid (Envelope II) for the project containing duly signed formats, each one duly closed separately, in one (1) original + 2 (two copies (duly attested) as desired by you in the RFP for your consideration.

8. It is confirmed that our Bid is consistent with all the requirements of submission as stated in the RFP and subsequent communications from NDMC.

9. The information submitted in our Bid is complete, strictly as per the requirements stipulated in the RFP and is correct to the best of our knowledge and understanding. We would be solely responsible for any errors or omissions in our Bid.

10. We confirm that all the terms and conditions of our Bid are valid for acceptance for a period of one hundred and twenty (120) days from the Bid Deadline.

11. We confirm that we have not taken any deviation so as to be deemed non-responsive with respect to the provisions stipulated in Clause 2.4.1 of the RFP.

12. We confirm that no order / ruling has been passed by an Appropriate Commission or a competent court against us or any of our Affiliates in the preceding one (1) year from the Bid Deadline for breach of any contract for supply of power having duration of contract in excess of one (1) year and that the bid security submitted by the us or any of our Affiliates has not been forfeited, either partly or wholly, in any bid process under Case-1 or Case -2 bidding procedure for procurement of power prescribed by Ministry of Power, Government of India, in the preceding one (1) year from the Bid Deadline to any licensee in India as per the provisions of Clause 2.1.8.

Dated the____ day of , 2014

Thanking you,

We remain,

Yours faithfully,

Name, Designation and Signature of Authorized Person in whose name Power of Attorney / Board Resolution as per Clause 2.4.1.1 is issued

4.2 Formats for Power of Attorney

POWER OF ATTORNEY

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution. Foreign companies submitting Bids are required to follow the applicable law in their country)

a) Power of Attorney to be provided by the Bidding Company in favor of its representative as evidence of authorized signatory's authority.

Know all men by these presents, We ……(name and address of the registered office of the Bidding Company of the Bidding Consortium, as applicable) do hereby constitute, appoint and authorize Mr./Ms……(name and residential address) who is presently employed with us and holding the position of …… as our true and lawful attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to submission of our Bid for supply of power on long-term basis through T a r i ff based competitive bidding process for meeting the requirements of issued by New Delhi Municipal Corporation(NDMC), including signing and submission of the Bid and all other documents related to the Bid, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document which NDMC may require us to submit. The aforesaid Attorney is further authorized for making representations to the NDMC, and providing information / responses to NDMC, representing us in all matters before the NDMC, and generally dealing with NDMC in all matters in connection with our Bid till the completion of the bidding process as per the terms of the RFP.

We hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall be binding on us and shall always be deemed to have been done by us.

All the terms used herein but not defined shall have the meaning ascribed to such terms under the RFP.

Signed by the within named ..... **[Insert the name of the executant company] through the hand of**
Mr. ……
duly authorized by the Board to issue such Power of Attorney

Dated this …… day of …….

Accepted
…… Signature of Attorney (Name, designation and address of the Attorney**)**

Attested

……
(Signature of the executant) (Name, designation and address of the executant)

……
Signature and stamp of Notary of the place of execution

Common seal of …… has been affixed in my/our presence pursuant to Board of Director's Resolution dated……

WITNESS

1. ……
(Signature)

Name ……

Designation.....……..

2. ……
(Signature)

Name ……

Designation.....……..

Notes:

(1) The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s).

(2) *In the event, power of attorney has been executed outside India, the same needs to be duly notarized by a notary public of the jurisdiction where it is executed.*

(3) Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a Board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

4.5 Format for Bidder's composition and ownership structure.

1. Corporate Details:

Please provide the following information for the Bidder.

a. Company's Name, Address, Nationality and Director's details:

Name:

Registered/Principal Address:

Website Address:

Corporate Identification Number, if any:

Country of Origin:

Address for Correspondence: …… ……

b. Year of Incorporation: _____

c. Company's Business Activities:

d. Name of the authorized representative:

Telephone Number: _____
Email Address: _____
Telefax Number: _____

e. Company's Local Address in India (if incorporated outside India):

f. Please provide the following documents:

(i) Copy of the Memorandum and Articles of Association and certificate of inCouncilor other equivalent organizational document (as applicable in the case of a foreign company), including their amendments, certified by the company secretary of the Bidding Company/each Member of the Consortium (as Attachment 1**)**

(ii) Authority letter in favor of …… *"NDMC* from the Bidding Company/each Member of the Consortium (as per format specified below) authorizing …… NDMC to seek reference from their respective bankers, lenders, financing institutions and any other person as given below in the Format for Authorization, as per Clause 2.1.7 of the RFP**.**

g. (Insert this point in case of Bidder being a Bidding Company) Whether the Bidder has already formed a Project Company:……(Yes/No) If Yes, the details of the Project Company as follows:

i) Name of the Project Company ……..
ii) Name of the Equity Holder ……
iii) Type and No. of Shares owned ……
iv) % of equity holding ……..
v) Extent of voting control(%) ……..
vi) Date of incorporation ……

2. Details of Ownership Structure:

Details of persons owning 10% or more of the total paid up equity of the Bidding Company

Name of the Bidding Company: …… Status of equity holding as on……

Name of Equity Holder	Type and Number of Shares owned	% of Equity Holding	Extent of Voting Control (%)
1			
2			
3			
4			
5			
6			

Notes:

1 Status of equity holding should be provided not earlier than 30 (thirty) days prior to Bid Deadline.

2 The above table is to be filled in separately for each Consortium Member if applicable.

For and on behalf of Bidding Company

M/s……

(Signature of Authorised Representative)
Name:……
Designation:……
Date:……
Place: ……

FORMAT FOR AUTHORISATION
(On Non – judicial stamp paper duly attested by Notary Public)

The undersigned hereby authorize(s) and request(s) all our Bankers, a list of which is attached herewith as Annexure A hereto, including its subsidiaries and branches, any person, firm, Councilor authority to furnish pertinent information deemed necessary and requested by NDMC to verify the authenticity of the documents / information submitted by us for meeting the Qualification Requirements in respect of our Bid for supply of power for 25 years through Tariff based competitive bidding process for meeting the requirements of NDMC Power Limited and / or regarding our financial standing and general reputation.

For and on behalf of M/s……. (Insert Name of Bidding Company)

…….. Signature and Name of the authorized representative of the Company

Company rubber stamp/seal

……
(Signature of Notary Public)

(Name and Address of the Attorney)
Place:……. Date:……

4.6 A : FORMAT FOR QUALIFICATION REQUIREMENT (AS PER CLAUSE 2.1.2)

To:

Attention: Director - Projects
Room No. 7008, Pallika Kendra Building
Parliament Street, New Delhi – 110001

Dear Sir,

Sub: Bid for supply of power for 25 years through Tariff based competitive bidding process for rooftop solar PV projects in New Delhi in response to RFP dated ……. *[Insert date in dd/mm/yyy].*

We submit our Bid / Bids for 4 MW project for which we submit details to satisfy the Qualification Requirements.

Technical Criteria

Project Development	**Technically Evaluated Entity that undertook the Project**	**Capacity Developed**	**Power Procurer**	**Details of equity held in the relevant project**	**Relationship with Bidder ***

(* Please attach the documents specified in Clause 2.1.2.2 to this letter.)

Financial Criteria

[Note: Applicable in case of Bidding Company]

We certify that the Networth Company had a Networth of Rs. ……. Crore or equivalent USD* computed as per instructions provided in Clause 2.1.2 of the RFP based on unconsolidated audited annual accounts (refer Note-2 below) of the last financial year immediately preceding the Bid Deadline.

Name of Networth Company whose networth is relied on **	**Relationship with Bidding Company *****	**Networth (Rs. Crore)**	**Financial Year**
1			
2			
3			
Total Networth			

* Equivalent USD shall be calculated as per provisions of Clause 2.1.2

*** The Networth Company may be the Bidding Company itself, i.e. the sole bidder

Rooftop Solar Power Experience (Clause 2.1.2.2(A)

Address of Rooftop Solar Power Project	installed capacity of the project	Name and address of the EPC contractor	Date of commissioning (Provide documentary evidence)

Yours faithfully

(Signature of Authorised Representative and rubber stamp of Bidding Company)

_____

Name: Date: Place:

(Signature and Stamp (on each page) of Statutory Auditors of Bidding Company)

Name: Date: Place:

WITNESS:

1. …… (Signature)

Name ……

Designation.....……..

Date:

2. …… (Signature)

Name ……

Designation.....……..

Date:

Notes:

1 Along with the above format, in a separate sheet, please provide details of computation of Networth duly certified by Statutory Auditor.

2 Audited consolidated annual accounts of the Bidder may also be used for the purpose of financial criteria provided the Bidder has at least 51% equity in each company whose accounts are merged in the audited consolidated accounts and provided further that the financial capability of such companies (of which accounts are being merged in the consolidated accounts) shall not be considered again for the purpose of evaluation of the Bid.

4.7 Format of Undertaking

(A) Bidder's Undertaking

[On the Letter Head of the Bidding Company]

To:

Attention:

Sub: **Bid for supply of power for 25 years through Tariff based competitive bidding process from rooftop solar PV project in New Delhi, New Delhi in response to RFP dated ……..**

Dear Sir,

1 We give our unconditional acceptance to the RFP and RFP Documents issued by NDMC as a part of the RFP dated …….. and as amended. We shall ensure that the Solar Company (as defined in the PPA) shall execute such RFP Documents as per the provisions of the RFP.

2 We have submitted our Financial Bid(s) strictly as per Format 4.9 of the RFP, without any deviations, conditions and without mentioning any assumptions or notes for the Financial Bid in the said format.

3 We have submitted the Bid on the terms and conditions contained in the RFP.

4 Our Bid (including Financial Bid) is valid up to the period required under Clause 2.9 of the RFP.

5 Our Bid (including Financial Bid) has been duly signed by authorised signatory and closed in the manner and to the extent indicated in the RFP and the Power of Attorney/ Board Resolution as per Clause 2.4.1.1 in requisite format as per RFP has been enclosed in original with this undertaking.

6. We undertake that if we are selected as the Selected Bidder we shall transfer all Consents, Clearances and Permits in the name of the Project Company within the period specified in the PPA and Project Implementation Agreement, if such Consents, Clearances and Permits have been obtained in the name of a company other than the Project Company prior to the submission of our Bid[4].

7. We confirm that our Bid meets the following conditions:
   a) The Scheduled Commercial Operation Date is not later than the date specified in the RFP, subject to the provisions of the Relevant PPA.

---

[4] Applicable to Bidding Consortium. Delete this in case of sole bidder.

8. We confirm that the Financial Bid(s) conform(s) to all the conditions in the RFP. including:

   a) Financial Bid(s) is/are in the prescribed Format 4.9, and is submitted duly signed by the authorised signatory

   b) Financial Bid(s) is/are unconditional

9. We have neither made any statement nor provided any information in this Bid, which to the best of our knowledge is materially inaccurate or misleading. Further, all the confirmations, declarations and representations made in our Bid are true and accurate. In case this is found to be incorrect after our selection as Selected Bidder, we agree that the same would be treated as a Solar Company's event of default under the PPA and Project Implementation Agreement, and consequent provisions of the PPA and Project Implementation Agreement shall apply.

……

Signature and name of authorized signatory in whose name Power of Attorney/ Board Resolution as per Clause 2.4.1.1 is issued

Original Power of Attorney/ Board Resolution as per Clause 2.4.1.1 is enclosed.

Rubber stamp of the Bidder to be affixed.

4.8 Format for Board Resolution

Format for the Board resolution to be passed by each Financially Evaluated Entity

The Board, after discussion, at the duly convened Meeting on ……. (Insert date), with the consent of all the Directors present and in compliance of the provisions of the Companies Act, 1956, passed the following Resolution:

1. RESOLVED THAT pursuant to the provisions of the Companies Act, 1956 and compliance thereof and as permitted under the Memorandum and Articles of Association of the company, approval of the Board be and is hereby accorded for issuing an Undertaking to the NDMC, in the format specified in the RFP, draft of which is attached hereto and initialled by the Chairman whereby the company undertakes to provide the ……....percent (… %) [Insert 100% in case of Bidding Company and percent of equity investment in the Project Company in case of Member of Consortium] of the Performance Guarantee, as per the terms and conditions of the RFP, representing the total amount of Performance Guarantee required to be provided by the …….. (Insert the name of the Bidding Company / Consortium Member), in case of failure of the …….. (Insert the name of the Bidding Company / Consortium Member) to provide such Performance Guarantee.

2. FURTHER RESOLVED THAT pursuant to the provisions of the Companies Act, 1956 and compliance thereof and as permitted under the Memorandum and Articles of Association of the company, approval of the Board be and is hereby accorded for issuing an undertaking to the NDMC whereby the company undertakes to invest equity in the Project Company to the extent of
……....percent (… %), as per the terms and conditions of the RFP, representing the amount of equity required to be provided by …….. (Insert the name of the Bidding Company / Consortium Member), in case of failure of …….. (Insert the name of the Bidding Company / Consortium Member) to invest such equity.

3. FURTHER RESOLVED THAT Mr/Ms……., be and is hereby authorized to take all the steps required to be taken by the Company for submission of Bid, including in particular, signing the Bid, making changes thereto and submitting amended Bid, all the documents related to the Bid, certified copy of this Board resolution or letter or undertakings etc, required to be submitted to Procurer/ NDMC as part of the Bid or such other documents as may be necessary in this regard.

[Note: In the event the Bidder is a Bidding Consortium, the following Board resolution no. 4 also needs to be passed by the Lead Member of the Bidding Consortium]

4. FURTHER RESOLVED THAT approval of the Board be and is hereby accorded to contribute such additional amount over and above the percentage limit (specified for the Lead Member in the Consortium Agreement) to the extent becoming necessary towards the total equity share in the Project Company, obligatory on the part of the Consortium pursuant to the terms and conditions contained in the Consortium Agreement dated ……. executed by the Consortium as per the provisions of the RFP.

[Note: The following resolution no. 5 is to be provided by the Bidding Company /Lead Member of the Consortium only]

5. FURTHER RESOLVED THAT Mr/Ms……., be and is hereby authorized to take all the steps required to be taken by the Company for submission of Bid, including in particular, signing the Bid, making changes thereto and submitting amended Bid, all the documents related to the Bid, certified copy of this Board resolution or letter or undertakings etc, required to be submitted to Procurer/ NDMC as part of the Bid or such other documents as may be necessary in this regard.

Certified True Copy

Signature and stamp of Company Secretary / Managing Director of Financially Evaluated Entity/ Notes:

1) This certified true copy should be submitted on the letterhead of the Company, signed by the Company Secretary / Managing Director of the Financially Evaluated Entity

2) The contents of the format may be suitably re-worded indicating the identity of the entity passing the resolution.

3) In case of the Board resolution being provided by a company incorporated in India, the Board resolution needs to be notarized by a notified notary. In the event the Board resolution is from a company incorporated outside India, the same needs to be duly notarized in its jurisdiction.

4) This format may be modified only to the limited extent required to comply with the local regulations and laws applicable to a foreign entity submitting this resolution. For example, reference to Companies Act 1956 may be suitably modified to refer to the law applicable to the entity submitting the resolution. However, in such case, the foreign entity shall submit an unqualified opinion issued by the legal counsel of such foreign entity, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid.

4.9 Format for Financial Bid

(The format should be on the Letter Head of the Bidding Company)
Date:_____
From :_____
(Insert name and address of Bidding Company) Tel.#:
Fax#:
E-mail address#

To:

Attention: NDMC address as mentioned

Sub: **Bid for supply of power on long term basis through Tariff based competitive bidding process from rooftop solar PV project in New Delhi in response to RFP dated ……. *[Insert date in dd/mm/yyy].***

Dear Sir,

We, the undersigned ……. *[insert name of the „Bidder"]* having read, examined and understood in detail the RFP and RFP Documents for development of the Projects in New Delhi and supply of power on long term basis through tariff based competitive bidding process for meeting the requirements of Procurer hereby submit our Financial Bid(s). We hereby undertake and confirm that:

1. we have submitted our Financial Bid strictly in accordance with the RFP without any deviations or condition.
2. that our Financial Bid is consistent with all the requirements of submission as stated in the RFP and subsequent communications from the Bid Process Coordinator.
3. Our Quoted Tariff for the 25

   Years Flat Tariff :
4. Acceptance

   We hereby unconditionally and irrevocably agree and accept that the decision made by the Bid Process Coordinator in respect of any matter concerning or arising out of the RFP and the selection of Selected Bidder thereof shall be binding on us. We hereby expressly waive any and all claims in respect of Bid process.

Dated the_____day of_____, 2014

Thanking you,

We remain,

Yours faithfully,

Name, Designation and Signature of Authorized Person in whose name Power of Attorney / Board Resolution as per Clause 2.4.1.1 is issued
4.10 Format of checklist for submission of Bid

Submission of Bid requirements Covering Letter as per Format 4.1	Response (Yes/No)
Original Power of Attorney as per Format 4.2	
Bidder's composition and ownership structure as per Format 4.5	
Details of meeting Qualification Requirement.	
Documentary evidence for meeting the Qualification Requirement as per Format 4.6 (A)	
Undertaking from the Financially Evaluated Entity or its Parent Company	
Applicable Board Resolutions as per Format 4.8	
Financial Bid as per Format 4.9	
Checklist of submission of Bid as per this Format 4.10	
Energy Generation Report	

4.11 Format for Disclosure (On the Letter Head of Bidding Company Disclosure

To:

Attention: Director (Projects)
7th Floor, RoomNo.7008
New Delhi Municipal Council
Palika Kendra, New Delhi
011-41501383
Mishraop@hotmail.com

Sub: Bidders' Disclosure for Bid for supply of power to Procurer in response to the RFP

dated … [Insert date] We hereby declare that the following companies with which we have direct or indirect relationship are also separately participating in this bidding process as per following details

Sl. No.	Name of the Company	Relationship
1.		
2.		
3.		

Further we confirm that we don't have any Conflict of Interest with any other Bidder participating in this bid process.

……
***Signature of* Authorised Representative**

Notes:

1. In case there is no such company please fill in the column "Name of the Company" as Nil and under column of Relationship as "Not Applicable".

Format 4.13

This undertaking should be on the Letter Head of the Bidding Company
To:

Attention: 7th Floor,
RoomNo.7008 New Delhi
Municipal Council Palika
Kendra, New Delhi 011-
41501383
Mishraop@hotmail.com

Dear Sir,
We refer to the Request for Proposal dated…. *[Insert Date]* issued by you for procurement of power from Projects in New Delhi on long term basis through tariff based competitive bidding process for meeting the requirements of Procurer.

(Insert in case of Bidding Company: "We have carefully read and examined in detail the RFP, including in particular, Clause 2.1.2.2 (b) of the RFP, regarding experience in rooftop solar power projects and submission of an undertaking, as per the prescribed Format 4.14.

We confirm and undertake that we shall engage an EPC contractor or an independent technical expert having experience of installation and commissioning of rooftop solar power projects for the purpose of installation and commissioning of the Project.

All the terms used herein but not defined, shall have the meaning as ascribed to the said terms under the RFP.

Signature of Authorised Representative

WITNESS

1. **……**
   (Signature)
   Name ……
   Designation.....……..

2. **……**
   (Signature)
   Name ……
   Designation.....……..

BIDDING PROCEDURE THROUGH TARIFF BASED COMPETITIVE BIDDING FOR THE DEVELOPMENT OF ROOFTOP SOLAR POWER PROJECTS OF 4 MW IN NEW DELHI MUNICIPALITY AREA AND THE PROCUREMENT OF ELECTRICITY GENERATED WHEREFROM BY NDMC IN THE STATE OF DELHI.

NEW DELHI MUNICIPAL COUNCIL

PALIKA KENDRA : SANSAD MARG

NEW DELHI - 110001

PABX No. 011-41501354-60

DATED THIS -- th DAY OF (Month), 2014

SOLAR POWER PURCHASE AGREEMENT

BETWEEN

NEW DELHI MUNICIPAL COUNCIL

AND

Power Producer Name
(Power Producer Address)

This Solar Power Purchase Agreement (as it may be amended from time-to-time, this "Agreement"), dated as of __, 2014 (the "Effective Date"), is by and between "), _____Successful Bidding, address, ("Power Provider") and New Delhi Municipal Council PALIKA KENDRA : SANSAD MARG NEW DELHI – 110001 , ("Purchaser, or NDMC"). The Power Provider, and Purchaser may be referred to hereinafter individually as "Party," or collectively as "Parties."

WHEREAS, Power Provider desires to install an electricity grid-connected photovoltaic, solar power plant with a total generating capacity rated at approximately ___ kWp (referred to as the "Generating Facility") located at Purchaser's rooftop's at Various NDMC Building in New Delhi (the "Site"); and WHEREAS, the Purchaser, is the owner of the Site; and WHEREAS, Power Provider desires shall design, build, own , and operate the rooftop solar PV (RTSPV) generating facility to sale electricity at an agreed PPA price to the purchaser.

WHEREAS, following a competitive selection process, on (Enter the date of Bid award) New Delhi Municipal Council to enter into this Agreement with Power Provider; and

NOW, THEREFORE, in consideration of the promises and the mutual benefits from the covenants hereinafter set forth, Power Provider and Purchaser agree as follows:

Definitions and Interpretation

Definitions

In addition to other capi talized terms specifically defined elsewhere in the Agreement or unless the context otherwise requires, the following words and phrases shall be defined as follows:

"**Affiliate**" means with respect to any specified Person, any other Person directly or indirectly controlling, controlled by or under common control with such specified Person.

"**Agreement**" means this power purchase agreement.

"**Applicable Law**" means all laws, treaties, regulations, standards, decrees, rules, decisions, judgments, orders, injunctions, interpretations, authorisations and directives applicable to the performance of the obligations of Parties and issued by any government authority having jurisdiction over the matter in question including Governmental Approval and that are in effect at the time in question, as well as any applicable environmental, occupational health and safety standards (including the terms of any environmental impact statement).

"Book Value" means the value at which an asset is carried on a balance sheet. It shall be calculated as the cost of an asset minus the accumulated depreciation.

"**Buy-out Date**" has the meaning set forth in Section 16.1

"**Buy-out Price**" has the meaning set forth in Section 16.1.

"Business Day" means a day other than Sunday or a statutory holiday on which NDMC is open for business;

"Control" in relation to a Person, means (a) beneficial ownership of more than 50% of the equity share capital of the Person or (b) the power to direct management or policies of the Person whether through (1) the right to cast more than 50% of the voting power of the Person, (2) the right to appoint a majority of directors on the board or similar body of Person, or (3) contractual or other arrangements.

"**Commercial Operation Date**" has the meaning set forth in Section 3.3(b).

"**Confidential Information**" has the meaning set forth in Section 18.1

"**Effective Date**" has the meaning set forth in Section 2.

"**Guaranteed Capacity utilization factor**" has the meaning set forth in Section 7.2.

"**Expiration Date**" means the date on which the Agreement terminates by reason of expiration of the Term.

"**Financing Party**" means, as applicable (i), or (ii) any Person (or its agent) who has made or will make a loan to or otherwise provide financing to the **Power Producer** (or an Affiliate of the **Power Producer**) with respect to the Project.

"**Force Majeure Event**" has the meaning set forth in Section 13.1.

"**Governmental Approval**" means any approval, consent, franchise, permit, certificate, resolution, concession, license, or authorization issued by or on behalf of any applicable Governmental Authority.

"**Governmental Authority**" means any central, state, regional, district, town, city, or municipal government, whether domestic or foreign, or any department, agency, bureau, or other administrative, regulatory or judicial body of any such government.

"**Installation Work**" means the construction and installation of the Project and the start-up, testing and acceptance (but not the operation and maintenance) thereof, all performed by or for the Power Producer at the Premises.

"**Invoice Date**" has the meaning set forth in Section 8.3.

"**kWh**" means kilowatt hour.

"**Letter of Credit**" has the meaning set forth in Section 8.2.

"**Liens**" has the meaning set forth in Section 10.3(a).

"**Losses**" means all losses, liabilities, claims, demands, suits, causes of action, judgments, awards, damages, cleanup and remedial obligations, interest, fines, fees, penalties, costs and expenses

(including all attorneys' fees and other costs and expenses incurred in defending any such claims).

"**Metering Date**" shall, for a given month, mean the first Business Day of a succeeding calendar month

"**Party**" or "**Parties**" has the meaning set forth in the preamble to this Agreement.

"**Person**" means an individual, partnership, corporation, limited liability company, business trust, joint stock company, trust, unincorporated association, joint venture, firm, or other entity, or a Governmental Authority.

"**Premises**" means the premises described in Schedule I to this Agreement.

"**Project Operations**" means the Power Producer's operation; maintenance and repair of the Project performed in accordance the requirements herein.

"**NDMC Indemnified Parties**" has the meaning set forth in Section 19

"**Solar Power**" means the supply of electrical energy output from the Project

"**Solar Power Payment**" shall mean the payment for Solar Power as per the applicable Tariff.

"**Tariff**" has the meaning set forth in Section 8.1.1.

"**Tariff Year**" shall mean each period of 12 (twelve) months starting from the Commercial Operations Date (first Tariff Year)and for each subsequent Tariff Year, a period of twelve (12) consecutive calendar months beginning from the next day from the date of expiry of the immediately preceding Tariff Year.

"**Term**" has the meaning set forth in Section 14.1.

"**notice of termination**" has the meaning set forth in Section 14.2.

Interpretation

In this Agreement, unless the context thereof otherwise requires: -

(i) Reference to singular includes reference to the plural and vice versa;

(ii) Reference to any gender includes a reference to all genders;

(iii) The expressions "hereof", "herein" and similar expressions shall be construed as references to this Agreement as a whole and not limited to the particular section or provision in which the relevant expression appears;

(iv) A reference to a person, corporation, trust, partnership, unincorporated body or other entity includes any of them;

(v) If a word or phrase is defined, its other grammatical forms have a corresponding meaning;

(vi) Any reference to any agreement or document shall be construed as an amended, varied, supplemented or novated in writing at the relevant time in accordance with the requirements of such agreement or document and if applicable to this Agreement with respect to amendments;

(vii) Reference to any legislation or law or to any provision thereof shall include references to any such law as it may, after the date hereof, from time to time, be amended, supplemented or re-enacted, and any reference to a statutory provision shall include any subordinate legislation made from time to time under that provision;

(viii) References to recitals, sections, clauses, paragraphs and schedules are references respectively to recitals, sections, clauses, paragraphs and schedules to this Agreement;

(ix) A reference to a Party to this Agreement or another agreement or document includes the Party's successors (including legal heirs) and permitted substitutes, permitted assigns and where applicable, it's legal personal representatives;

(x) A reference to conduct includes, without limitation, an omission, statement or undertaking whether or not in writing;

(xi) Words and abbreviations, which have, well known technical or trade/commercial meaning, used in this Agreement, shall carry their technical or trade/commercial meaning;

(xii) A reference to writing includes a facsimile transmission and any means of reproducing words in a tangible and permanently visible form;

(xiii) The headings in this Agreement are for convenience only and shall not affect its interpretation.

(xiv) If there is a conflict between the terms and conditions of this Agreement, then such conflict shall be resolved by giving precedence to the terms and conditions of the agreement.

Effective Date of the agreement

This Agreement shall be effective on the day means the date on which the last signatory to this Agreement affixes its signature hereto.

Construction, Installation and Testing of the Project

System installation Work

System installation work includes the following points.

a) Design, engineering, installation, monitoring, Warranty.

b) Permitting, paperwork processing of the System.
c) Availing any government subsidy/incentive/rebate, if any

The **Power Producer** shall perform the Installation Work at the Premises as per the timings approved by the NDMC or its Affiliates from time to time in a manner that minimizes inconvenience to and interference with the use of the Premises to the extent practical.

Approvals

Power Producer shall be solely responsible for taking all necessary statutory Governmental Approvals for the development, designing, installation, commissioning, operation and maintenance of the Project and for selling the Solar Power to the NDMC and/or its Affiliates.

Project Testing

The **Power Producer** shall in the presence of NDMC's designated representative conduct testing of the Project in accordance with such methods, acts, guidelines, standards and criteria reasonably accepted or followed by photovoltaic solar system integrators internationally. Power produce need to demonstrate the minimum PR of 75% at the time of testing. The PR will be measured at Inverter output level during peak radiation conditions.

If the results of such testing indicate that the Project is capable of generating electrical energy for 5 (five) continuous hours using such instruments and meters as have been installed for such purposes, then **Power Producer** shall send a written notice to NDMC to that effect. NDMC shall send its acceptance to the test report within seven (7) days of receipt and the date of such acceptance shall be the "**Commercial Operation Date**."

The NDMC shall pay for the power generated during the period of testing and up to Commercial Operation Date. Payment will be a product of energy meter reading and PPA tariff.

Site Access and Project Completion

The NDMC shall cause to provide the **Power Producer** with limited non-exclusive access to the relevant part of the Premises to perform the Installation Works and completion of the Project and for ongoing maintenance during the Project operational period. The NDMC shall provide to the **Power Producer** a lay down area situated adjacent or near to the Premises (or individual buildings) for the purposes of storage of its equipment and materials and staging requirements.

The preparation of the Premise(s) including relocation of pre-existing equipment, towers, antennae and other fitments and fixtures (if required) shall be solely decided by the NDMC and shall be in the scope of the NDMC.

Unless otherwise agreed between the Parties, the **Power Producer** shall not allow (a) chipping of rooftop; or (b) any disturbance/damage to the water proofing of the Premises roof.

In case NDMC requires any roof space for installation of dish antenna(s), cooling tower(s) at any time during the Term, then **Power Producer** shall remove the solar panels installed at such roof space and reinstall them at other place in the same rooftop or some other rooftop as directed by the NDMC. The NDMC shall pay the cost of relocation to the **Power Producer**. NDMC will also liable to pay for the loss of electricity generation due to the relocation activity. Loss of electricity will be paid off as per deemed generation clause.

Based on the description of the Project in Schedule I and having regard to the indicative time period for commissioning an individual solar power plant, **Power Producer** within Sixty (60) days of the Effective Date, submit to the NDMC and the building manager of the NDMC shop drawings of the Project for approval ("**Shop Drawings**").

NDMC shall endorse and confirm the Shop Drawings within a reasonable time period of fifteen (15) days from the date of submission of the Shop Drawings.

Subject to any punch-list items which shall be agreed by the NDMC as not being material to completion of the Project, **Power Producer** agrees to achieve the completion of the Project on or before **31th January, 2015** ("**Scheduled Completion Date**") provided that **Power Producer** is provided access to the Premises in accordance with this Agreement. Provided further that a grace period of two (2) weeks shall be **provided** to the **Power Producer** to complete Project acceptance testing and achieve synchronization and Commercial Operation Date of the Project. NDMC shall ensure that sufficient load is available at the Delivery Point to ensure synchronization and drawal of power from solar power plant.

Delay Liquidated Damages

In the event of a delay in achieving the Scheduled Completion Date for completion of the Project by the **Power Producer**, provided that such delay was not as a direct result of NDMC's negligence or breach of its obligations hereunder, the **Power Producer** shall pay to the NDMC by way of delay liquidated damages. Parties agree that such liquidated damages shall not be considered a penalty for a failure to achieve the Project completion by the Scheduled Completion Date. The **Power Producer** shall be required to pay liquidated damages calculated by multiplication of applicable Tariff and the number of units of Solar Power generation lost during the delayed period. Loss of solar power generation will be calculated as per minimum guaranteed CUF. The liquidated damages shall be calculated from the expiry of the grace period of two weeks from the Scheduled Completion Date up to the Commercial Operations Date.

The Parties agree that the liquidated damages specified represent a genuine and reasonable pre-estimate of the losses likely to be suffered by the NDMC in the event that completion of the Project is not achieved by the Scheduled Completion Date and are not in the nature of a penalty.

Project Operations

The Power Producer as Owner and Operator

The Project will be legally and beneficially owned by the Power Producer and will be operated and maintained and, as necessary, repaired by the Power Producer at its sole cost and expense, either through itself or its appointed agency.

Metering

The **Power Producer** shall install and maintain two utility grade kilowatt-hour (kWh) meter at the Delivery Point at each injection point near the LT panels for the measurement of electrical energy produced by the Project and the same shall be used as the main meter and check meter for the measurement of electrical energy produced by the Project. The main meter reading will be used for the billing purpose. Reading of the meter of the electrical energy produced by the Project shall be taken jointly on the Metering Date by the **Power Producer** and the NDMC designated representative. In case the main meter found faulty, then for that specific period, reading of check meter shall be considered and main meter shall be replaced/ repaired. And doing so, will be in the scope of work of Power Producer. Both the meters shall be calibrated at a regular interval of 1 year.

Calculation of CUF

CUF of the proposed solar PV plant shall be calculated on the cumulative AC installed capacity (cumulative inverter capacity) of the plant. Formula for the calculation of the CUF is as follows:

Annual CUF for 1st year =
(Actual kWh value evident by energy meter) / (Total AC capacity in kWh installed × 8760)

Delivery of Solar Power

Delivery Point

The Solar Power shall be delivered at the LT panels at the Premises as provided by the NDMC and its Affiliates ("**Delivery Point**"), wherein the risk and title of electricity shall pass on to the NDMC. It shall be responsibility of NDMC to provide interconnection point at the LT panels.

Guaranteed Capacity utilization factor

After installing the systems/ plants, the Power Producer must maintain a minimum of 15% CUF. A degradation factor of 1% is applicable on minimum guaranteed generation for any particular year. Refer point (f) of clause 14.3 of this document for calculation of minimum guaranteed CUF for any particular year.

If the will deduct the excess expenditures involved in purchasing DISCOM power on the difference of agreed minimum guaranteed generation of power and the actual generated power. However, if the less generation is due to Force majeure conditions, then the penalty will not apply.

7.3 **Title to the Project**

Throughout the Term, Power Producer shall be the legal and beneficial owner of the System at all times, including all Environmental Attributes, and the System shall remain the personal property of Power Producer and shall not attach to or be deemed a part of, or fixture to, the Facility or the Premises. Each of the Power Producer and NDMC agree that the Power Producer is the tax owner of

the System and all tax filings and reports will be filed in a manner consistent with this Agreement. The System shall at all times retain the legal status of personal property. NDMC covenants that it will use commercially reasonable efforts to place all parties having an interest in or a mortgage, pledge, lien, charge, security interest, encumbrance or other claim of any nature on the Facility or the Premises on notice of the ownership of the System and the legal status or classification of the System as personal property. If there is any mortgage or fixture filing against the Premises which could reasonably be construed as prospectively attaching to the System as a fixture of the Premises, NDMC shall provide a disclaimer or release from such lien holder. If NDMC is the fee owner of the Premises, NDMC consents to the filing of a disclaimer of the System as a fixture of the Premises in the office where real estate records are customarily filed in the jurisdiction where the Facility is located.

Price and Payment

Tariff Payments

The tariff payable for the Solar Power supplied by the **Power Producer** to the NDMC at the Delivery Point ("**Tariff**") shall be at the rate of:

Rs _____ per kWh;

Tariff payments shall become applicable with effect from the Commercial Operations Date.

Payment Security

Not later than fifteen (15) days prior to the Commercial Operations Date, the NDMC through a scheduled commercial bank in India, open an irrevocable revolving letter of credit in favour of the **Power Producer** for an amount equivalent to two (2) months' average billing based upon the Estimated Annual Production and shall have a term of twelve (12) months ("**Letter of Credit**"). The Letter of Credit shall be maintained at all times during the entire Term and in case of any invocation of the Letter of Credit, the same shall be restored to the original amount applicable for the relevant Tariff Year. The NDMC shall cause the Letter of Credit to be adjusted annually such that the amount of the Letter of Credit at all times be equivalent to invoice amount for two (2) months basis of the Estimated Annual Production for the relevant Tariff Year.

Invoice

The **Power Producer** shall invoice NDMC on the first business day of each month (each, an "**Invoice Date**"), commencing on the first Invoice Date to occur after the Commercial Operation Date, for the Solar Power Payment in respect of the immediately preceding month. The last invoice shall include production only through the Expiration Date of this Agreement.

Invoice shall be raised as per the joint meter reading as per Clause 6.2. The Parties will also compare main and check meter readings at the time of joint meter reading.

Time of Payment

The NDMC shall pay all amounts due hereunder within 15 (fifteen) days from the date of the receipt of the invoice. In case of non-payment of the Solar Power Payment as per the invoice, within the

aforementioned period of 15 (fifteen) days, then the **Power Producer** shall be entitled to charge an interest @ 1% per month on the amount of the invoice for the period of delay beyond the aforementioned period of fifteen (15) days.

Method of Payment

NDMC shall make all payments under the Agreement by means of cheque/demand drafts/electronic funds transfer in immediately available funds to the account designated in writing by the **Power Producer** from time to time. All payments that are not paid when due shall bear interest on the outstanding amount accruing from the date becoming due as provided in Clause 8.4 above until paid in full. All payments made hereunder shall be subject to the applicable tax deduction at source, any other tax, levy, assessment, duties or other charges.

Disputed Payments

If a dispute arises with respect to any invoice, NDMC shall not be deemed to be in default under the Agreement and the Parties shall not suspend the performance of their respective obligations hereunder. In the event of a dispute in respect of any invoice, the NDMC shall pay 90% of the amount invoiced, subject to reconciliation of such invoice between the Parties.

Delegation of Environmental Attributes

Power Producer shall own, and may assign or sell in its sole discretion, all right, title and interest associated with or resulting from all Environmental Attributes and Solar Renewable Energy Credits associated with the Generating Facility

General Covenants

Power Producer's covenant

The **Power Producer** covenants and agrees to the following:

(a) Notice of Damage or Emergency: The **Power Producer** promptly notify NDMC if it becomes aware of any damage to or loss of the use of the Project or that could reasonably be expected to adversely affect the Project, immediately notify NDMC once it becomes aware of any event or circumstance that poses an imminent risk to human health, the environment, the Project or the Premises.

(b) Project Condition: The **Power Producer shall** take all actions reasonably necessary to ensure that the Project is capable of providing Solar Power at a commercially reasonable continuous rate.

(c) Governmental Approvals: While providing the Installation Work, Solar Power and Project Operations, the **Power Producer** shall obtain and maintain and secure all Governmental Approvals required to be obtained and maintained and secured by the **Power Producer**, to enable the **Power Producer** to perform its obligations hereunder.

(d) Health and Safety: The **Power Producer** shall take all necessary and reasonable safety precautions with respect to providing the Installation Work, Solar Power, and Project Operations that shall comply with all Applicable Laws pertaining to the health and safety of persons and real and personal property.

Power Producer's Representatives

During the subsistence of this Agreement, the **Power Producer** undertakes to respond all questions, concerns and complaints of the NDMC regarding the Project in a prompt and efficient manner. The **Power Producer** designates the following individual as its representative pertaining to performance of this Agreement till the Commercial Operation Date:

Name: Mr.
Designation:
Telephone:
Facsimile:
E- mail:

The **Power Producer** designates the following individual as its representative and primary point of contact pertaining to performance of this Agreement following the Commercial Operation Date till termination:

Name: Mr.
Designation:
Telephone:
Facsimile:
E- mail:

NDMC's Covenants

NDMC covenants and agrees to the following:

(a) Liens: NDMC shall not directly or indirectly cause, create, incur, assume or suffer to exist any Liens on or with respect to the Project or any interest therein.

(b) Access to Premises, Grant of right to use: NDMC hereby grants to the **Power Producer** a limited non-exclusive right, coterminous in accordance with the terms of this Agreement to ingress and egress the Premises and access to electrical panels and conduits to interconnect or disconnect the Project with the Premises' electrical wiring with the prior consent and approval of the NDMC's authorized representative identified by the NDMC.

(c) Temporary storage space during installation or removal: NDMC shall provide sufficient space at the Premises for the temporary storage and staging of tools, materials and equipment and for the parking of construction crew vehicles and temporary construction trailers and facilities reasonably necessary during the Installation Work, Project Operations or Project removal, and access for rigging and material handling.

Representations & Warranties

Representations and Warranties Relating to Agreement Validity

In addition to any other representations and warranties contained in the Agreement, each Party represents and warrants to the other that:

(a) it is duly organized and validly existing and in good standing in the jurisdiction of its incorporation;

(b) it has the full right and authority to enter into, execute, deliver, and perform its obligations under the Agreement;

(c) it has taken all requisite corporate or other action to approve the execution, delivery, and performance of the Agreement;

(d) the Agreement constitutes its legal, valid and binding obligation enforceable against such Party in accordance with its terms; and

(e) its execution and performance of the Agreement and the transactions contemplated hereby do not constitute a breach of any term or provision of, or a default under, (i) any contract or agreement to which it or any of its Affiliates is a party or by which it or any of its Affiliates or its or their property is bound, (ii) its organizational documents, or (iii) any Applicable Laws.

Taxes and Governmental Fees

NDMC Obligations

NDMC shall reimburse and pay for any taxes, or duties such as cross subsidy charges, wheeling charges, electricity duty, municipal tax per unit of sale of energy, wheeling charges, banking charges, imposed by Government/ Discom or any authorized agency for the sale of power to NDMC (other than income taxes imposed upon the Power Producer). The Power Producer shall notify NDMC in writing with a detailed statement of such amounts, which shall be invoiced by the Power Producer and payable by NDMC.

Power Producer Obligations

Subject to Section 12.1 above, the **Power Producer** shall be responsible for all income taxes and any and all franchise fees or similar fees assessed against it due to its ownership of the Project. The **Power Producer** shall not be obligated for any taxes payable by or assessed against NDMC based on or related to NDMC's overall income or revenues.

Force Majeure

In the event that either Party is delayed in or prevented from performing or carrying out its obligations under this Agreement by reason of any cause beyond the reasonable control of, and

without the fault or negligence of, such Party (an event of "Force Majeure"), such circumstance shall not constitute an event of default, and such Party shall be excused from performance hereunder and shall not be liable to the other Party for or on account of any loss, damage, injury, or expense resulting from, or arising out of, such delay or prevention; provided, however, that the Party encountering such delay or prevention shall use commercially reasonable efforts to remove the causes thereof (with failure to use such efforts constituting an event of default hereunder). The settlement of strikes and labor disturbances shall be wholly within the control of the Party experiencing that difficulty.

As used herein, the term "Force Majeure" shall include, without limitation, (i) sabotage, riots or civil disturbances, (ii) acts of God, (iii) acts of the public enemy, (iv) terrorist acts affecting the Site, (v) an annual level of direct beam solar resource availability that is less than or equal to 90% of historical averages as measured by long-term weather data (minimum of five (5) years) collected at the Site and/or other reliable calibrated and appropriate weather station representative of the Site, (vi) volcanic eruptions, earthquake, hurricane, flood, ice storms, explosion, fire, lightning, landslide or similarly cataclysmic occurrence, (vii) requirement by Utility that the Generation Facility discontinue operation for any reason, (viii) appropriation or diversion of electricity by sale or order of any governmental authority having jurisdiction thereof, or (ix) any other action by any governmental authority which prevents or prohibits the Parties from carrying out their respective obligations under this Agreement (including, without limitation, an unstayed order of a court or administrative agency having the effect of subjecting the sales of Energy Output to federal or state regulation of prices and/or services, or elimination or alteration of one or more Environmental Incentives or other change in law that results in a material adverse economic impact on Power Provider). Economic hardship of either Party shall not constitute a Force Majeure under this Agreement.

Term and Termination

Term of this Agreement

The term of this Agreement shall commence from the Effective Date of this Agreement and shall be valid till the expiry of 25 (twenty five) years from the Commercial Operation Date, unless terminated earlier ("**Term**").

Termination for NDMC Event of Default

The **Power Producer** shall have the right to serve a **notice of termination** of this Agreement on the NDMC if:

(a) upon occurrence of an Insolvency Event of the NDMC;

(b) failure of the NDMC to meet payment obligations as set forth in this Agreement, for a period of sixty (60) days, following demand;

(c) defaults on any other material obligations under this Agreement, affecting the performance of the **Power Producer** and does not rectify such default within sixty (60) days from the date of receipt of written notice from the **Power Producer** to the NDMC intimating the occurrence of such default.

Termination for the Power Producer Event of Default

The NDMC shall have the right to terminate this Agreement with the **Power Producer** if any of the following events occurs and is not remedied by **Power Producer** within a period of 30 (thirty) days of its coming to notice of **Power Producer**:

(a) upon occurrence of an Insolvency Event of the **Power Producer**;

(b) if the **Power Producer** fails to achieve Project completion in within 1(one) year from the execution of this Agreement;

(c) if the **Power Producer** abandons the operation of the Project and/or fails to supply Solar Power in accordance with this Agreement after the Commercial Operation Date for more than thirty (30) consecutive days or more than sixty (60) days in a year;

(d) if the **Power Producer** is not able to obtain or maintain or renew a government approval required to install, operate and maintain the Plant;

(e) if the **Power Producer** fails to obtain and maintain any Governmental Approvals materially affecting the ability of the **Power Producer** to supply Solar Power in accordance with this Agreement*;*

(f) if the Solar plant operates at less than the minimum guaranteed CUF for consecutive 5 (five) years of contractual period. However, an annual degradation of 0.8% shall be applicable on guaranteed CUF of 15% (Considering 15% CUF in the base/first year of operation);

Example: Formula to calculate the minimum guaranteed generation for any given year is

(CUF of the recent last year)× (100%─0.8%) = (Minimum guaranteed CUF of this year)

In case 1st year minimum CUF is 15% then the 2nd year minimum CUF with effect of annual degradation factor shall be

15% × (100%─ 0.8%) = 14.88%

(g) if the **Power Producer** conducts improper and unsafe operation and maintenance practices at the Project; or

(h) if the **Power Producer** defaults in any of its obligations under this Agreement,

(i) if the **Power Producer** breaches any of the representation and/or warranty set forth by it in this Agreement,

(j) in case of threat to safety and security of the Premises/building on which Premises is located/ occupants of the buildings on which Premises is located due to any commission/omission of the **Power Producer** or its agents, contractors, servants, vendors, material men or suppliers etc.

Power Producer shall immediately stop construction/operation of the Project in case of occurrence of any of the events as mentioned above in this Clause 14.3.

(j) Assignment

This Agreement may not be assigned in whole or in part by either Party without the prior written consent of the other Party, which consent shall not be unreasonably withheld or delayed. Provided further that the NDMC may, with a written notice to the **Power Producer**, assign any of its rights, obligations, interests, benefits arising out of/in connections with this Agreement to an Affiliate. The **Power Producer** may, with the prior written approval of the NDMC (which would not be unreasonably withheld), have a right to assign any of its rights, obligations, interests, benefits arising out of this Agreement in favour of its lenders' extending financial assistance for the Project.

II) **Financing:** The Parties acknowledge that Seller may obtain construction and long-term financing or other credit support from one or more Financing Parties.

Removal of Project upon expiry of the Term

Upon the expiry of the Term, the Power Producer at its own expense, remove all of its tangible property and equipments comprising the Project from the Premises on a mutually convenient date but in no case later than thirty (30) days after the date of expiry of the Term. If the Power Producer fails to remove the Project by such agreed upon date, NDMC shall have the right, at its option, to remove the Project at the Power Producer's cost.

Notices

Notice Addresses

Unless otherwise provided in the Agreement, all notices and communications concerning the Agreement shall be in writing and addressed to the Parties at the addresses set forth below:

In case of notice to the Power Producer:

Attention : _____
Address : _____
Telephone : _____
Facsimile : _____
E-mail : _____

If case of notice to the NDMC:

Attention : _____
Address : _____
Telephone : _____
Facsimile : _____
E-mail : _____

Service of Notices

Unless otherwise provided herein, any notice provided for in the Agreement shall be hand delivered, sent by registered post, or by courier delivery, or transmitted by facsimile or email and shall be deemed delivered to the addressee or its office when received at the address for notice specified above when hand delivered or sent by courier delivery, upon posting if sent by registered post and upon confirmation of sending when sent by facsimile/email (if sent during normal business hours or the next business day if sent at any other time).

Confidentiality

Confidentiality Obligation

The term "**Confidential Information**" for the purpose of this Agreement shall mean the proceedings in the course of the bid process for the award of the Project, all information provided by NDMC during the course of the bidding process whether orally or in writing, and the bid submissions made by the Power Producer in response to the RFP.

"Confidential Information" shall not include any such information which is:

a) Already in the possession of or known to the Power Producer prior to the date hereof or not otherwise subject to obligations of confidentiality;

b) In or becomes part of the public domain through no fault of or breach of this Agreement by the Power Producer;

c) Received by the Power Producer from any third party without restriction or any obligation of confidentiality imposed on or by such third party prior to its disclosure by NDMC;

d) Independently developed by the Power Producer whether on its own or jointly with a third party(ies) without use of the Confidential Information;

e) Approved for release or use by written authorisation of NDMC; or

f) Required to be disclosed by any law, judicial order or decision, request or any regulation or rule of any governmental, supervisory or regulatory authority.

g) Sharing of data shall be allowed to any governmental organisation or organisation providing the subsidy to the project.

Obligation Of Confidentiality

In consideration of the disclosure and release of the Confidential Information by NDMC to the Power Producer, the Power Producer hereby agrees that:

(a) Save as provided in this Agreement, to hold and keep in confidence any and all such Confidential Information and not to disclose the Confidential Information or any part thereof to any third party;

(b) The Power Producer will not use the Confidential Information for any purpose without prior written permission of NDMC;

(c) At NDMC's written request or upon termination of this Agreement, to return or to destroy (as per NDMC' written request) any Confidential Information provided to the Power Producer, provided that the Power Producer may retain (i) such copies thereof for the purposes of and so long as required by any law, court or regulatory agency or authority or its internal compliance procedures; and (ii) copies of any computer records and files

containing any Confidential Information which have been created pursuant to the Power Producer's automatic archiving and back-up procedures, provided that, the Power Producer shall continue to maintain as confidential all such Confidential Information retained by it as per the terms of this Agreement. The Power Producer acknowledges that neither the return of any Confidential Information nor the expunging of any of the same from its records will release it from its obligations under this Agreement.

(d) NDMC hereby acknowledges and agrees that the Power Producer shall be entitled to copy and circulate the Confidential Information to such of its professional advisors and to its directors, officers and employees whose knowledge of such information is necessary for the purpose of the bidding process and subject to the same confidentiality obligation as provided in this Agreement. Any persons to whom the Confidential Information is disclosed shall be expressly informed of its confidential nature and the purpose for which it may be used. Further, if the Power Producer uses third party service providers to perform certain services on its behalf, it may disclose Confidential Information to such service providers, subject to the Power Producer having obtained appropriate assurances concerning confidentiality and compliance of the terms of this Agreement.

Permitted Disclosures

Notwithstanding any other provision contained herein, neither Party shall be required to hold confidential any information that:

becomes publicly available other than through the receiving Party;

is required to be disclosed by a Governmental Authority, under Applicable Law or pursuant to a validly issued notice or required filing, but a receiving Party subject to any such requirement shall promptly notify the disclosing Party of such requirement;

is independently developed by the receiving Party; or

becomes available to the receiving Party without restriction from a third party under no obligation of confidentiality.

Indemnity

The Power Producer agrees that it shall indemnify and hold harmless NDMC, and their directors, officers and employees (collectively, the "**NDMC Indemnified Parties**") from and against any and all Losses incurred by the NDMC Indemnified Parties due to any third party claims, suits, actions, damages, losses or consequential damages expenses, costs, obligations, and liabilities including, without limiting the generality of the foregoing, liabilities for attorneys' fees, suffered, directly or indirectly, by **NDMC Indemnified Parties** which may arise or result from the breach of any covenant or term or condition, undertaking, representation or obligation under this Agreement by the Power Producer and/or its agents or resulting or arising from any representation or warranty provided by the Power Producer and/or its agent turning out to be false or inaccurate in any respect.

Dispute Resolution

All disputes or differences between any of the parties to this Agreement in respect of or concerning or connected with the interpretation or implementation of this Agreement or arising out of or in connection with this Agreement ("**Disputes**"), shall at the first instance be resolved through mutual discussions between the officials of the disputing parties, which shall begin promptly after a Party has delivered to the other Party a written request for such consultation.

If the disputing parties are unable to resolve the Dispute in question within fourteen (14) days of the commencement of mutual discussions in terms of Section 20.1, then the disputing parties shall jointly appoint a sole expert of the subject matter of the Dispute within fifteen (15) days of the expiry of the aforementioned consultation period of fourteen (14) days. The final decision of the sole expert shall be binding on the Parties and shall be considered to be an award under the provisions of the Arbitration and Conciliation Act, 1996 or any statutory amendments/modifications thereto for the time being in force.

In case, the disputing parties are unable to appoint the sole expert within the aforementioned period of fifteen (15) days or dispute is not resolved by the sole expert, then the same shall be resolved by arbitration which shall be conducted by sole arbitrator appointed by NDMC. The arbitration proceedings shall be conducted in accordance with the Arbitration and Conciliation Act, 1996. All arbitration proceedings shall be conducted in the English language and the place of arbitration shall be New Delhi, India.

Any award made by the arbitrators shall be final and binding on the Parties that were parties to the dispute.

This Section 20 is severable from the rest of this Agreement and shall remain in effect even if this Agreement is terminated for any reason.

Miscellaneous

Amendments

This Agreement may only be amended, modified or supplemented by an instrument in writing executed by duly authorized representatives of the each of the Parties.

Cumulative Remedies

Except as set forth to the contrary herein, any right or remedy of the Power Producer or NDMC shall be cumulative and without prejudice to any other right or remedy, whether contained herein or not.

No Waiver

The failure of the Power Producer or NDMC to enforce any of the provisions of the Agreement, or the waiver thereof, shall not be construed as a general waiver or relinquishment on its part of any such provision, in any other instance or of any other provision in any instance.

Survival

The obligations under Sections 16.1 (*Early Termination*), 16.2 (*Removal of Project*), Section 10.1(d) (*Power Producer's Covenant*), Section 12 (*Taxes and Governmental Fees*), Section 17 (*Notices*), Section 18 (*Confidentiality*), Section 19 (*indemnity),* Section 21 (*Miscellaneous*), or pursuant to other provisions of this Agreement that, by their nature and context, are intended to survive termination of this Agreement shall survive the expiration or termination of this Agreement for any reason.

Governing Law & Jurisdiction

This Agreement shall be governed by and construed in accordance with the laws of India. The Parties agree that the courts at New Delhi shall have jurisdiction over any action or proceeding arising under the Agreement.

Severability

If any term, covenant or condition in the Agreement shall, to any extent, be invalid or unenforceable in any respect under Applicable Law, the remainder of the Agreement shall not be affected thereby, and each term, covenant or condition of the Agreement shall be valid and enforceable to the fullest extent permitted by Applicable Law and, if appropriate, such invalid or unenforceable provision shall be modified or replaced to give effect to the underlying intent of the Parties and to the intended economic benefits of the Parties.

Successors and Assigns

This Agreement and the rights and obligations under the Agreement shall be binding upon and shall inure to the benefit of the Power Producer and NDMC and their respective successors and permitted assigns.

Counterparts

This Agreement may be executed in one or more counterparts, all of which taken together shall constitute one and the same instrument

Independent Service Provider

This Agreement is on a principal to principal basis between the Parties hereto. Nothing contained in this Agreement shall be construed or deemed to create any association, partnership or joint

venture or employer-employee relationship or principal-agent relationship in any manner whatsoever between the Parties.

Publicity

The Parties shall not use each other's name and/or trademark/logo or publicise or release any information about this Agreement or its contents or market, publish, advertise in any manner any information without prior written consent of the other Party.

Insurance

The Power Producer shall maintain at its own costs throughout the tenure of this Agreement, insurance coverage for adequate amount including but not restricted to, comprehensive general liability insurance covering the Project and accidental losses, bodily harm, injury, death of all individuals employed/assigned by the Power Producer to perform the services required under this Agreement. The Power Producer shall assign the insurance to the NDMC upon the NDMC exercising its option for termination of this Agreement, subject to the NDMC paying the Power Producer the pro-rata cost of the insurance for the unexpired period of the policy/policies.

Records

Each Party hereto shall keep complete and accurate records of its operations hereunder and shall maintain such data as may be necessary to determine with reasonable accuracy any item relevant to this Agreement. Each Party shall have the right to examine all such records insofar as may be necessary for the purpose of ascertaining the reasonableness and accuracy of any statements of costs relating to transactions hereunder.

Publicity

The Parties share a common desire to generate favorable publicity regarding the Generating Facility and their association with it. The Parties agree that they will, from time-to-time, issue press releases regarding the Generating Facility and that they shall cooperate with each other in connection with the issuance of such releases including, without limitation, completed review of press releases proposed to be issued by the other Party by no later than four (4) business days after submission by such other Party. Each Party agrees that it shall not issue any press release regarding the Generating Facility without the prior consent of the other, and each Party agrees not to unduly withhold or delay any such consent.

On all signage at Site, and in all publicly distributed materials and other public communications issued by either Party that refer to the Generating Facility by name, such name shall be followed by a statement to the effect that Power Provider owns and operates the Generating Facility.

Deemed Generation

In case power producer is not able to evacuate power to the NDMC due to any reason in account of NDMC, generation due to that period will be considered as Deemed Generation. Deemed generation will be compensated @ of minimum guaranteed CUF in particular year.

IN WITNESS WHEREOF the Parties have caused the Agreement to be duly executed through their duly authorized representatives as of the date set forth above.

Signed and delivered by within named **Name of successful Power Producer** _____ Authorized Signatory Name: Designation:	Signed and delivered by within named **New Delhi Municipal Council** _____ Authorized Signatory Name: Designation:

SCHEDULE I
Description of the Premises and the Project

Project: _____kW Solar PV Rooftop Project
Building: **New Delhi Municipal Council**
Battery Storage: No
Whether Grid Connection is available in the Premises: Yes
Interconnection Point: LT panels at the every floor of the every building/ block.

Annexure: Illustrative List of Buildings

DETAILED PROJECT REPORT

For

Installation & Commissioning
Of
130 kWp Grid Connected Roof Top Solar PV system
Under JNNSM Program

At

Navyug Education Society, Hanuman Road, New Delhi (Delhi)

Prepared for

New Delhi Municipal Council
Delhi.

Prepared by
Darashaw & Company Pvt. Ltd.
December 2013

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130kWp Grid Connected Roof Top Solar Photovoltaic system at Navyug Education Society School, Hanuman Road, New Delhi

1. INTRODUCTION

Harnessing of non polluting renewable energy resources to control green house gases is receiving impetus from the government of India. The solar mission, which is part of the National Action Plan on Climate Change has been set up to promote the development and use of solar energy in for power generation and other uses with the ultimate objective of making solar energy competitive with fossil-based energy options. The mission is a major initiative of the Government of India and State Governments to promote ecologically sustainable growth while addressing India's energy security challenge. It will also constitute a major contribution by India to the global effort to meet the challenges of climate change. The solar photovoltaic device systems for power generation had been deployed in the various parts in the country for electrification where the grid connectivity is either not feasible or not cost effective as also some times in conjunction with diesel based generating stations in isolated places and communication transmitters at remote locations.

The immediate aim of the Mission is to focus on setting up an enabling environment for solar technology penetration in the country both at a centralized and decentralized level. The first phase (up to March 2013) will, inter alia, focus on promoting grid connected systems.

With the downward trend in the cost of solar energy and appreciation for the need for development of solar power, solar power projects have recently been implemented. A significant part of the large potential of solar energy in the country could be developed by promoting solar photovoltaic power systems of varying sizes as per the need, affordability and area availability kilowatt level solar photovoltaic power plant of adequate capacity can be proposed for the location.

It has been proposed to set up a **130 kWp** stand alone solar photovoltaic system on the roof top of Navyug Education Society School Building which will generate power and supplied to the grid.

The **130 kWp** Solar PV System to be installed in school is estimated to generate of **173 MWh** and operate at a capacity factor of 14%. The SPV system estimated to cost **Rs. 130 lakh** including the cost of installation and commissioning.

2. OBJECTIVES OF THE PROGRAMME

The objectives are as follows:

- To promote grid applications of solar energy for meeting the targets set in the Jawaharlal Nehru National Solar Mission for Phase-I.
- To create awareness and to demonstrate effective and innovative use of Solar systems for individual, community, institutional and industrial applications.
- To encourage innovation in addressing market needs and promoting sustainable business models.
- To provide support to channel partners and potential beneficiaries, within the framework of boundary conditions and in a flexible demand driven mode.
- To create a paradigm shift needed for commoditization of grid decentralized solar applications.
- To support consultancy services, seminars, symposia, capacity building, awareness campaigns, human resource development, etc.
- To encourage replacement of kerosene& diesel, wherever possible.

3. SCOPE OF THE SCHEME

The scheme would be applicable to all parts of India and would, to begin with, be co-terminus with Phase-I of the Jawaharlal Nehru National Solar Mission and will, inter alia, focus on promoting grid connected and decentralized systems.

Various grid connected solar photo voltaic systems / applications up to a maximum capacity of 100 kWp per site and decentralized solar thermal applications, to meet / supplement lighting, electricity/power, heating and cooling energy requirements would be eligible for being covered under the Scheme.

4. SALIENT FEATURES

1. Location

i.	State	New Delhi
ii.	City	New Delhi
iii.	Location	New Delhi Municipal Council
iv.	Latitude	26° 61' 00" N
v.	Longitude	77° 23' 00" E

2. Area and Type for SPV Plant

i.	Area	2355 sq meter
ii.	Type	Roof Top System
iii.	Specific Location	On roof top of the Navyug Education Society School

3. SPV Power Plant

i.	Capacity	130 kWp
ii.	No. of modules	250
iii.	Connections	in series 3
		in parallel 84
iv.	DC BUS	1 No.

4. Technical details of a SPV Module

a) PV Module type Poly crystalline

b) Electrical Parameter

i.	Maximum Power Rating	250 Wp
ii.	Rated Current	4.25 A
iii.	Rated Voltage	12 V
iv.	Short Circuit Current	5 A

v. Open Circuit Voltage 21 V

5. Mounting Arrangement

i. Mounting Fixed Type
ii. Tilt angle(slope) 20°
iii. Position Roof Top mounted

6. Inverter/ Power Conditioning Unit (PCU)

i. Number of units 1
ii. Rated Capacity 80 kVA
iii. Input Voltage range 170 V (Max.)
iv. Output Voltage 415 V AC
v. Frequency 50 Hz
vi. Efficiency 95%

7. Grid Connection Details

i. Electrical parameters for interconnection 415 V, 3Ph ,50 Hz

8. Annual Energy Generation

i. Annual Energy 173 MWh

9. Cost Estimate

i. Estimated Cost Solar PV System Rs. 130.00 lakh

10. Construction Time 8 months

5. PROJECT PROPOSAL

As per the observation based on the data collected on area availability and shadow free area of 2000 sq meter, it is proposed to install around 130 KWp grid connected Solar PV system in the roof top of Navyug Education Society School.

Navyug Education Society School Building has an open roof space of 2000 sq meter which can be utilized for solar PV system. It is proposed to install a 130 kWp Solar PV Roof Top System on the open space available at the roof top. The system will be connected to available grid and the generated electricity will be connected to grid. NDMC will sign Power Purchase Agreement (PPA) of preferential tariff to supply the generated power to the grid.

The **130 kWp** SPV system at roof-top of Navyug Education Society School is estimated to afford annual energy generation of **173 MWh** (i.e. 0.173 million units) and operate at a capacity factor of 14%. The SPV system estimated to cost Rs. 1 Lakhs/kWp without battery bank for which 30% capital Subsidy is available from MNRE. If the utility is installing grid connected solar PV system to meet the RPO obligation, it has two options to avail. It would be either 30% capital subsidy or else they can avail REC benefits. But the utility cannot avail both the benefits of subsidy and REC.

The total system cost for NDMC, New Delhi will be **Rs. 130 Lakh**, which will include system cost with installation and commissioning.

6. SITE DESCRIPTION

The NDMC has sufficient vacant roof top space without any obstacle for sunlight, which can be used for Solar PV installations. It is proposed to utilize a vacant area available of about 2000 sq meters on this roof top to accommodate a cumulative capacity of 130 kWp of solar PV modules.

The above mentioned grid connected power plant would also be considered as the demonstration system and for public awareness.

7. FUNCTIONAL DESCRIPTION OF SPV POWER SYSTEM

The solar PV system shall be designed with either mono/ poly crystalline silicon modules or using thin film photovoltaic cells or any other superior technology having higher efficiency.

Three key elements in a solar cell form the basis of their manufacturing technology. The first is the semiconductor, which absorbs light and converts it into electron-hole pairs. The second is the semiconductor junction, which separates the photo-generated carriers (electrons and holes), and the third is the contacts on the front and back of the cell that allow the current to flow to the external circuit. The two main categories of technology are defined by the choice of the semiconductor: either crystalline silicon in a wafer form or thin films of other materials.

The stand alone roof top solar PV system generally comprises the following equipment.

I. Solar Panels (PV) Modules
II. Charge Controllers
III. Inverters
IV. Battery Bank
V. Mounting Structure
VI. AC and DC Cables
VII. Earthing equipment /material
VIII. Junction Boxes or combiners
IX. Instruments and protection equipments

7.1. Solar Panels (PV) Modules

The DC electricity produced by the solar panel or module(s) is used to charge batteries via a solar charge controller. Any DC appliances that are connected to the battery will need to be fused. DC lights are normally connected to the charge controller. Any AC appliances are powered via an inverter connected directly to the batteries. NOTE: inverters used in grid tie and stand alone systems are different and should not be interchanged.

Most Stand Alone PV Systems need to be managed properly. Users need to know the limitations of a system and tailor energy consumption according to how sunny it is and the State of Charge (SOC) of the battery.

7.2. Configuration

The solar panels need to be configured to match the system DC voltage, which is determined by the battery. System voltages are typically, 12V DC and 24V DC, larger systems will operate at 48V DC.

The operating voltage of a solar panel in a stand-alone system must be high enough to charge the batteries. For example, a 12V battery will require 14.4V to charge it. The solar panel must be able to deliver this voltage to the battery after power losses and voltage drop in the cables and charge controller and in conditions in which the solar cells operate at a high temperature. A solar panel with a Voc of about 20V is required to reliably charge a 12V battery.

7.3. Charge Controllers

A charge controller is designed to protect the battery and ensure it has a long working life without impairing the system efficiency. Batteries should not be overcharged and the function of the charge controller is to ensure that the battery is not over charged. Charge controllers are designed to function as follows:

- Protect the battery from over-discharge, normally referred to as Low Voltage Disconnect (LVD) that disconnects the battery from the load when the battery reaches a certain depth of discharge (DOD).
- Protect the battery from over-charging by limiting the charging voltage – this is important with sealed batteries – it is usually referred to as High Voltage Disconnect (HVD).
- Prevent current flowing back into the solar panel during the night, so called reverse current.

7.4. Inverters

Inverters are used for DC voltage to AC voltage conversion. Inverter input voltage depends on inverter power, for small power of some 100 W the voltage is 12 or 24 V, and 48 V or even more for higher powers. For large systems 3-phase inverters are available. Storage batteries use and store DC – Direct Current and have a low voltage output usually in the range of 12 – 24 volts. Virtually all modern appliances operate on AC – Alternating Current and work on 240 volts. An inverter is a device that takes the power from your DC battery source and through special technology boosts it to household AC electricity giving you the power to run appliances such as televisions, lights, computers, and power tools wherever you may be. Simply, an inverter increases 12/24/48-volt battery power to 110/240 AC power.

7.5. Battery Bank

The power requirements of standalone PV systems are rarely in sync with the battery charging. Appliances and loads need to be powered when there is sufficient solar radiation, during overcast weather and during the night. Bad weather may last for several days and the daily charging and discharging of the batteries takes its toll on them. Batteries that are able to handle the constant charging and discharging are known as

deep cycle batteries. Batteries need to have a good charging efficiency, low charging currents and low self-discharge.

7.6. Cables and Accessories

Cables need to be UV resistant and suitable for outdoor applications. It is very important to keep power losses and voltage drop in the cable to a minimum. It is recommended that this be less than 3% between the array and the batteries and less than 5% between the battery and DC loads.

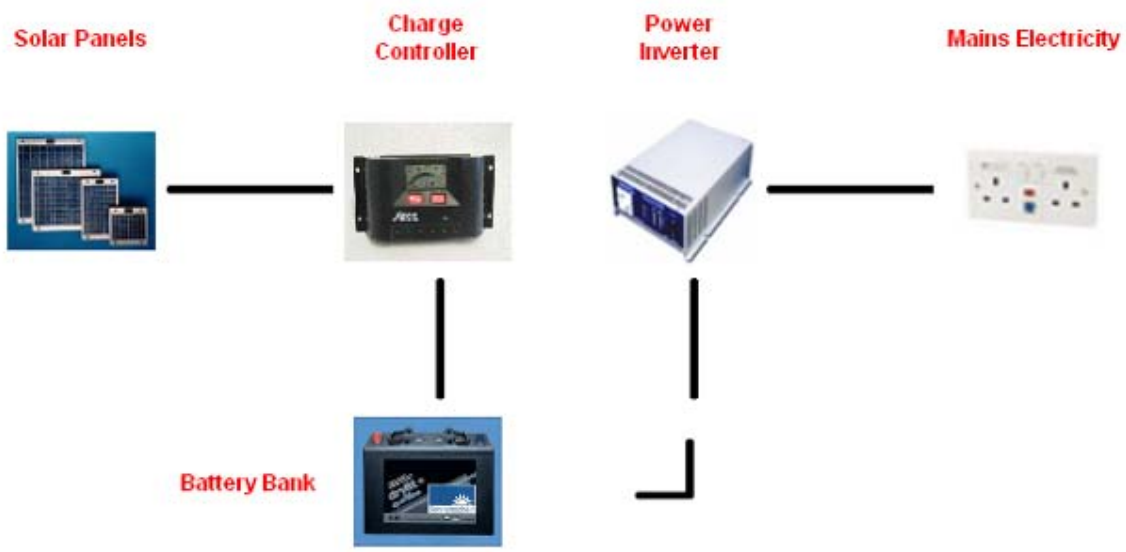


Figure 1: Components of a Stand Alone Solar PV System

8. ANNUAL ENERGY GENERATION

The annual energy generation from the SPV power plant has been worked out based on the data on mean global solar radiant exposure over Delhi. The mean global solar radiant exposure varies from 4.27 kWh/m^2/day in the month of December to 6.28 kWh/m^2/day in the month of April. The month-wise mean global solar radiant exposure is given at Annexure-I. Considering the efficiency of PV module at 18% and temperature coefficient of 0.4 % per °C, the annual energy generation is estimated as 173 MWh (i.e. 0.173 million units). This takes into consideration an efficiency of the Power Conditioning Unit (PCU) as 95% and losses in the DC and AC system as 4% each up to the point of interconnection. The month wise energy generation during the year is given at Annexure-II and shown below.

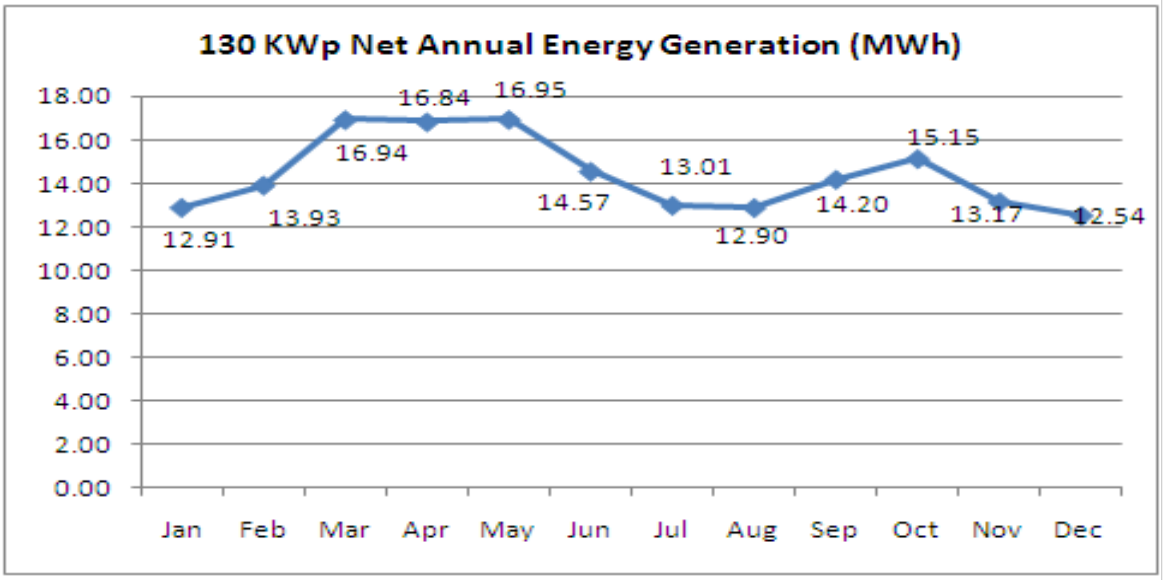


Figure 2: Month wise Energy Generation

The energy available from the Plant would vary from a minimum of 12.54 MWh during the month of December to a maximum of 16.95 MWh during the month of May. The annual capacity utilization factor works out as 14%.

The Energy Generation simulation for the Navyug Education Society School Building is given in Annexure-III.

9. ESTIMATES OF COST

9.1. Stand Alone Solar PV Power Plant

As per the present market conditions the cost for 130kWp stand alone solar power plant including installation and commissioning is Rs. 1 Lakhs/ kWp. Therefore, the cost of 130kWP system is estimated as Rs. 130 Lakhs. The detailed specification with Bill of materials giving indicative cost of major equipments is provided in Annexure – IV.

The reputed make of the major equipments for standalone solar PV roof top system is provided in Annexure – V.

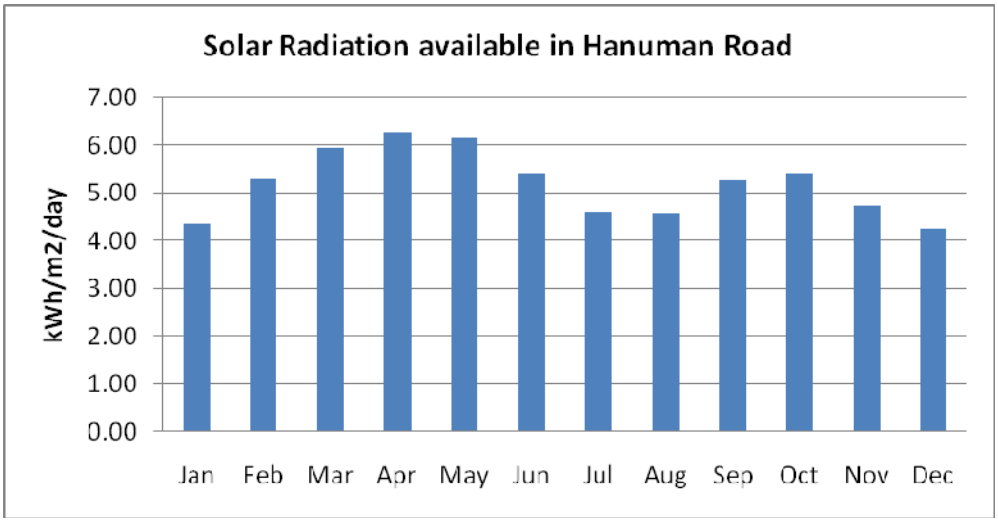
10. AREA AVAILABILITY

10.1. Roof Area Availability for Stand Alone Solar Power Plant

The total roof space available at Navyug Education Society School Building is about 2355 sq meter which is presently vacant and can be utilized for solar roof top system. There is no nearby upcoming project which may block the way of sun the roof space is an ideal place for installation of SPV system. The proposed system of 130 kWp require a roof space of about 2000 sq meters, therefore from the available roof space of dimensions (33m x 18m) + (45m x 30m) + (37m x 9m) + (13m x 6m) can be utilized very effectively for the solar power plant installation. The layout of the roof space with orientation is provided in Annexure VI.

Annexure I: Mean Global Solar Radiant Exposure, New Delhi

Month	Daily solar radiation - horizontal kWh/m²/d
Jan	4.37
Feb	5.30
Mar	5.97
Apr	6.28
May	6.16
Jun	5.43
Jul	4.61
Aug	4.58
Sep	5.28
Oct	5.42
Nov	4.75
Dec	4.27
Annual	**5.20**



Annexure II:130 kWp Roof Top Solar PV System at Navyug Education Society School Building, New Delhi

Month	Energy Generation (MWh)
Jan	12.91
Feb	13.93
Mar	16.94
Apr	16.84
May	16.95
Jun	14.57
Jul	13.01
Aug	12.90
Sep	14.20
Oct	15.15
Nov	13.17
Dec	12.54
Annual	**173.11**

Annexure III: Energy Generation simulation for the Navyug Education Society School Building, New Delhi

Natural Resources Canada | Ressources naturelles Canada — Canada

RETScreen® International
www.retscreen.net

Clean Energy Project Analysis Software

Project information — *See project database*

Project name	Navyug Education Society School
Project location	Delhi
Prepared for	NDMC
Prepared by	Darashaw
Project type	Power
Technology	Photovoltaic
Grid type	Central-grid
Analysis type	Method 2
Heating value reference	Higher heating value (HHV)
Show settings	☐

Site reference conditions — *Select climate data location*

Climate data location	Delhi/Safdarjung
Show data	☑

	Unit	Climate data location	Project location
Latitude	°N	28.6	28.6
Longitude	°E	77.2	77.2
Elevation	m	216	216
Heating design temperature	°C	7.3	
Cooling design temperature	°C	40.6	
Earth temperature amplitude	°C	23.7	

Month	Air temperature	Relative humidity	Daily solar radiation - horizontal	Atmospheric pressure	Wind speed	Earth temperature	Heating degree-days	Cooling degree-days
	°C	%	kWh/m²/d	kPa	m/s	°C	°C-d	°C-d
January	14.3	70.9%	3.74	99.1	2.2	14.1	115	133
February	16.8	63.0%	4.76	98.9	2.5	18.2	34	190
March	22.3	53.9%	5.89	98.5	2.8	26.0	0	381
April	28.8	39.8%	6.79	98.0	3.1	32.8	0	564
May	32.5	39.7%	6.96	97.6	3.1	36.3	0	698
June	33.4	52.3%	6.30	97.2	3.1	36.1	0	702
July	30.8	70.9%	5.27	97.2	2.5	31.3	0	645
August	30.0	75.7%	5.10	97.4	2.2	29.2	0	620
September	29.5	70.1%	5.46	97.9	2.2	28.0	0	585
October	26.3	62.5%	5.04	98.4	1.7	25.1	0	505
November	20.8	63.7%	4.13	98.9	1.4	20.1	0	324
December	15.7	70.1%	3.55	99.1	1.9	15.2	71	177
Annual	25.1	61.1%	5.25	98.2	2.4	26.1	220	5,524
Measured at	m				10.0	0.0		

NASA | UNEP | GEF | reeep

Complete Energy Model sheet

RETScreen Energy Model - Power project

Proposed case power system

Technology		Photovoltaic
Analysis type		○ Method 1 ◉ Method 2
Resource assessment		
Solar tracking mode		Fixed
Slope	°	40.0
Azimuth	°	60.0

☑ Show data

Month	Daily solar radiation - horizontal kWh/m²/d	Daily solar radiation - tilted kWh/m²/d	Electricity export rate $/MWh	Electricity exported to grid MWh
January	3.74	4.37		12.91
February	4.76	5.30		13.93
March	5.89	5.97		16.94
April	6.79	6.28		16.84
May	6.96	6.16		16.95
June	6.30	5.43		14.57
July	5.27	4.61		13.01
August	5.10	4.58		12.90
September	5.46	5.28		14.20
October	5.04	5.42		15.15
November	4.13	4.75		13.17
December	3.55	4.27		12.54
Annual	**5.25**	**5.20**	**0.00**	**173.10**

Annual solar radiation - horizontal	MWh/m²	1.92
Annual solar radiation - tilted	MWh/m²	1.90

Photovoltaic

Type		mono-Si
Power capacity	kW	130.00
Manufacturer		X
Model		X (1 unit(s))
Efficiency	%	18.0%
Nominal operating cell temperature	°C	45
Temperature coefficient	% / °C	0.40%
Solar collector area	m²	722
Miscellaneous losses	%	10.0%

Inverter

Efficiency	%	95.0%
Capacity	kW	130.0
Miscellaneous losses	%	10.0%

Summary

Capacity factor	%	15.2%
Electricity exported to grid	MWh	173.10

Annexure IV: Bill of Material for 130 kWp Roof top SPV System

Sl. No.	Component Name	Type and / or Model No.	Description of Components	Quantity/ System	130 KW SPV Grid Connected System
1	SPV Module (Poly Crystalline)	240 Wp or equivalent	30 V, 7.8 Amps/ module	Sets of 250 nos. SPV module (84 in parallel and 3 in series)	5,473,684
2	Structure	Module type	MS Hot dip galvanized steel	LS	855,263
3	Inverter Rating	96 V D/C – input 415 V AC – output	11 kVA power rating with synchronizer & meter equipped with data logging facilities	8 no.	1,539,474
4	Field Junction Box	Reputed make	Dust & water proof		1,710,526
5	Main Junction Box	Reputed make	Dust & water proof		
6	Ground Fault Protection System		Included at inverter	1 no.	
7	Cables	Conforming to BIS	25 sq mm PVC cables	As per site conditions	
8	Lightening Arresters			1 no.	
9	Earthing	Reputed make		1 set	
	Total Systems Hardware				
10	Civil works and electrical works			LS	855,263
11	Installation and commissioning			LS	855,263
12	Annual Maintenance for 5 years			LS	855,263
13	Transportation and insurance			LS	855,263
	Total				**13,000,000.00**

Annexure V: Reputed Make of Major Equipments for Roof Top SPV System

MNRE Empanelled Manufacturers

Annexure VI: Useable Roof Space Available at Navyug Education Society School Building

Note: Dimensions are not to the Scale
The available roof space is around 2000 sq meter which is more than sufficient for 130kWp roof top SPV system, the total space will be (33m x 18m) + (45m x 30m) + (37m x 9m) + (13m x 6m) = 2355 sq meter

Annexure VII: Snapshots of Roof Space Available at Building

DETAILED PROJECT REPORT

For

Installation & Commissioning
Of
60kWp Grid Connected Roof Top Solar PV system
Under JNNSM Program

At

NP Co Ed Primary School, Netaji Nagar,
New Delhi (Delhi)

Prepared for

New Delhi Municipal Council
Delhi.

Prepared by
Darashaw & Company Pvt. Ltd.
December 2013

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60kWp Grid Connected Roof Top Solar Photovoltaic system at NP Co Ed Primary School, Netaji Nagar, New Delhi

1. INTRODUCTION

Harnessing of non polluting renewable energy resources to control green house gases is receiving impetus from the government of India. The solar mission, which is part of the National Action Plan on Climate Change has been set up to promote the development and use of solar energy in for power generation and other uses with the ultimate objective of making solar energy competitive with fossil-based energy options. The mission is a major initiative of the Government of India and State Governments to promote ecologically sustainable growth while addressing India's energy security challenge. It will also constitute a major contribution by India to the global effort to meet the challenges of climate change. The solar photovoltaic device systems for power generation had been deployed in the various parts in the country for electrification where the grid connectivity is either not feasible or not cost effective as also some times in conjunction with diesel based generating stations in isolated places and communication transmitters at remote locations.

The immediate aim of the Mission is to focus on setting up an enabling environment for solar technology penetration in the country both at a centralized and decentralized level. The first phase (up to March 2013) will, inter alia, focus on promoting grid connected systems.

With the downward trend in the cost of solar energy and appreciation for the need for development of solar power, solar power projects have recently been implemented. A significant part of the large potential of solar energy in the country could be developed by promoting solar photovoltaic power systems of varying sizes as per the need, affordability and area availability kilowatt level solar photovoltaic power plant of adequate capacity can be proposed for the location.

It has been proposed to set up a **60 kWp** stand alone solar photovoltaic system on the roof top of NP Co Ed Primary School Building which will generate power and supplied to the grid.

The **60 kWp** Solar PV System to be installed in school is estimated to generate of **79.891 MWh** and operate at a capacity factor of 18%. The SPV system estimated to cost **Rs 60 lakh** including the cost of installation and commissioning.

2. OBJECTIVES OF THE PROGRAMME

The objectives are as follows:

- To promote grid applications of solar energy for meeting the targets set in the Jawaharlal Nehru National Solar Mission for Phase-I.
- To create awareness and to demonstrate effective and innovative use of Solar systems for individual, community, institutional and industrial applications.
- To encourage innovation in addressing market needs and promoting sustainable business models.
- To provide support to channel partners and potential beneficiaries, within the framework of boundary conditions and in a flexible demand driven mode.
- To create a paradigm shift needed for commoditization of grid decentralized solar applications.
- To support consultancy services, seminars, symposia, capacity building, awareness campaigns, human resource development, etc.
- To encourage replacement of kerosene& diesel, wherever possible.

3. SCOPE OF THE SCHEME

The scheme would be applicable to all parts of India and would, to begin with, be co-terminus with Phase-I of the Jawaharlal Nehru National Solar Mission and will, inter alia, focus on promoting grid connected and decentralized systems.

Various grid connected solar photo voltaic systems / applications up to a maximum capacity of 100 kWp per site and decentralized solar thermal applications, to meet / supplement lighting, electricity/power, heating and cooling energy requirements would be eligible for being covered under the Scheme.

4. SALIENT FEATURES

1. Location

i.	State	New Delhi
ii.	City	New Delhi
iii.	Location	New Delhi Municipal Council
iv.	Latitude	28° 61' 00" N
v.	Longitude	77° 23' 00" E

2. Area and Type for SPV Plant

i.	Area	854 sq meter
ii.	Type	Roof Top System
iii.	Specific Location	On roof top of the NP Co Ed Primary School

3. SPV Power Plant

i.	Capacity	60 kWp
ii.	No. of modules	250
iii.	Connections	in series 3
		in parallel 84
iv.	DC BUS	1 No.

4. Technical details of a SPV Module

a) PV Module type Poly crystalline

b) Electrical Parameter

i.	Maximum Power Rating	250 Wp
ii.	Rated Current	4.25 A
iii.	Rated Voltage	12 V
iv.	Short Circuit Current	5 A

v. Open Circuit Voltage 21 V

5. Mounting Arrangement

i. Mounting Fixed Type
ii. Tilt angle(slope) 40°
iii. Position Roof Top mounted

6. Inverter/ Power Conditioning Unit (PCU)

i. Number of units 1
ii. Rated Capacity 80 kVA
iii. Input Voltage range 170 V (Max.)
iv. Output Voltage 415 V AC
v. Frequency 50 Hz
vi. Efficiency 95%

7. Grid Connection Details

i. Electrical parameters for interconnection 415 V, 3Ph ,50 Hz

8. Annual Energy Generation

i. Annual Energy 79.891 MWh

9. Cost Estimate

i. Estimated Cost Solar PV System Rs. 60.00 lakh

10. Construction Time 8 months

5. PROJECT PROPOSAL

As per the observation based on the data collected on area availability and shadow free area of 850 sq meter, it is proposed to install around 60 KWp grid connected Solar PV system in the roof top of NP Co Ed Primary school.

NP Co Ed Primary School Building has an open roof space of 850 sq meter which can be utilized for solar PV system. It is proposed to install a 60 kWp Solar PV Roof Top System on the open space available at the roof top. The system will be connected to available grid and the generated electricity will be connected to grid. NDMC will sign Power Purchase Agreement (PPA) of preferential tariff to supply the generated power to the grid.

The **60 kWp** SPV system at roof-top of NP Co Ed Primary School is estimated to afford annual energy generation of **79.891 MWh** (i.e. 0.079 million units) and operate at a capacity factor of 18%. The SPV system estimated to cost Rs. 1 Lakhs/ kWp without battery bank for which 30% capital Subsidy is available from MNRE. If the utility is installing grid connected solar PV system to meet the RPO obligation, it has two options to avail. It would be either 30% capital subsidy or else they can avail REC benefits. But the utility cannot avail both the benefits of subsidy and REC.

The total system cost for NDMC, New Delhi will be **Rs. 60 Lakh**, which will include system cost with installation and commissioning.

6. SITE DESCRIPTION

The NDMC has sufficient vacant roof top space without any obstacle for sunlight, which can be used for Solar PV installations. It is proposed to utilize a vacant area available of about 850 sq meters on this roof top to accommodate a cumulative capacity of 60 kWp of solar PV modules.

The above mentioned grid connected power plant would also be considered as the demonstration system and for public awareness.

7. FUNCTIONAL DESCRIPTION OF SPV POWER SYSTEM

The solar PV system shall be designed with either mono/ poly crystalline silicon modules or using thin film photovoltaic cells or any other superior technology having higher efficiency.

Three key elements in a solar cell form the basis of their manufacturing technology. The first is the semiconductor, which absorbs light and converts it into electron-hole pairs. The second is the semiconductor junction, which separates the photo-generated carriers (electrons and holes), and the third is the contacts on the front and back of the cell that allow the current to flow to the external circuit. The two main categories of technology are defined by the choice of the semiconductor: either crystalline silicon in a wafer form or thin films of other materials.

The stand alone roof top solar PV system generally comprises the following equipment.

I. Solar Panels (PV) Modules
II. Charge Controllers
III. Inverters
IV. Battery Bank
V. Mounting Structure
VI. AC and DC Cables
VII. Earthing equipment /material
VIII. Junction Boxes or combiners
IX. Instruments and protection equipments

7.1. Solar Panels (PV) Modules

The DC electricity produced by the solar panel or module(s) is used to charge batteries via a solar charge controller. Any DC appliances that are connected to the battery will need to be fused. DC lights are normally connected to the charge controller. Any AC appliances are powered via an inverter connected directly to the batteries. NOTE: inverters used in grid tie and stand alone systems are different and should not be interchanged.

Most Stand Alone PV Systems need to be managed properly. Users need to know the limitations of a system and tailor energy consumption according to how sunny it is and the State of Charge (SOC) of the battery.

7.2. Configuration

The solar panels need to be configured to match the system DC voltage, which is determined by the battery. System voltages are typically, 12V DC and 24V DC, larger systems will operate at 48V DC.

The operating voltage of a solar panel in a stand-alone system must be high enough to charge the batteries. For example, a 12V battery will require 14.4V to charge it. The solar panel must be able to deliver this voltage to the battery after power losses and voltage drop in the cables and charge controller and in conditions in which the solar cells operate at a high temperature. A solar panel with a Voc of about 20V is required to reliably charge a 12V battery.

7.3. Charge Controllers

A charge controller is designed to protect the battery and ensure it has a long working life without impairing the system efficiency. Batteries should not be overcharged and the function of the charge controller is to ensure that the battery is not over charged. Charge controllers are designed to function as follows:

- Protect the battery from over-discharge, normally referred to as Low Voltage Disconnect (LVD) that disconnects the battery from the load when the battery reaches a certain depth of discharge (DOD).
- Protect the battery from over-charging by limiting the charging voltage – this is important with sealed batteries – it is usually referred to as High Voltage Disconnect (HVD).
- Prevent current flowing back into the solar panel during the night, so called reverse current.

7.4. Inverters

Inverters are used for DC voltage to AC voltage conversion. Inverter input voltage depends on inverter power, for small power of some 100 W the voltage is 12 or 24 V, and 48 V or even more for higher powers. For large systems 3-phase inverters are available. Storage batteries use and store DC – Direct Current and have a low voltage output usually in the range of 12 – 24 volts. Virtually all modern appliances operate on AC – Alternating Current and work on 240 volts. An inverter is a device that takes the power from your DC battery source and through special technology boosts it to household AC electricity giving you the power to run appliances such as televisions, lights, computers, and power tools wherever you may be. Simply, an inverter increases 12/24/48-volt battery power to 110/240 AC power.

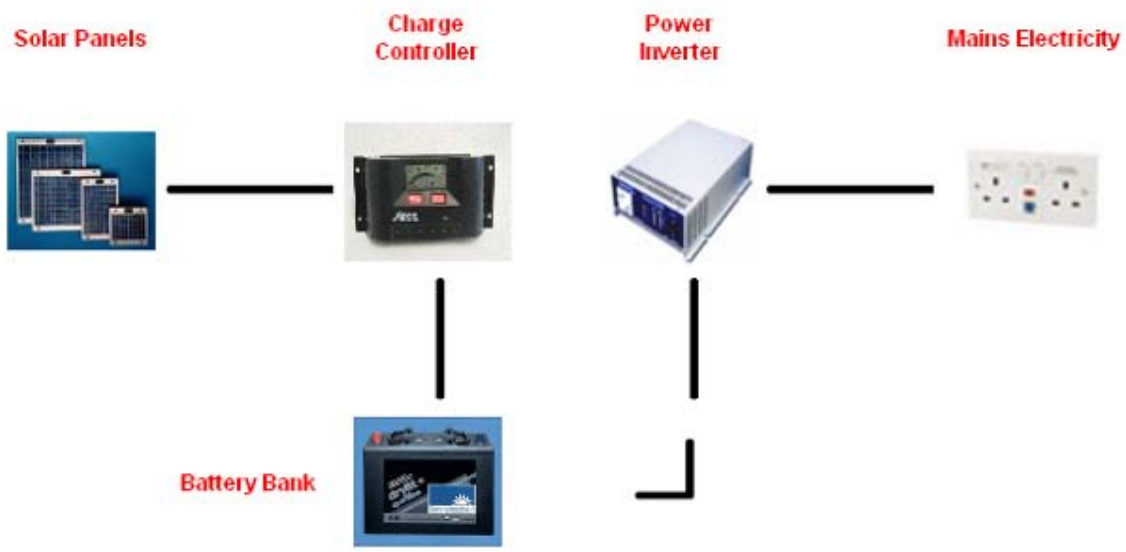
7.5. Battery Bank

The power requirements of stand alone PV systems are rarely in sync with the battery charging. Appliances and loads need to be powered when there is sufficient solar radiation, during overcast weather and during the night. Bad weather may last for several days and the daily charging and discharging of the batteries takes its toll on them. Batteries that are able to handle the constant charging and discharging are known as

deep cycle batteries. Batteries need to have a good charging efficiency, low charging currents and low self-discharge.

7.6. Cables and Accessories

Cables need to be UV resistant and suitable for outdoor applications. It is very important to keep power losses and voltage drop in the cable to a minimum. It is recommended that this be less than 3% between the array and the batteries and less than 5% between the battery and DC loads.



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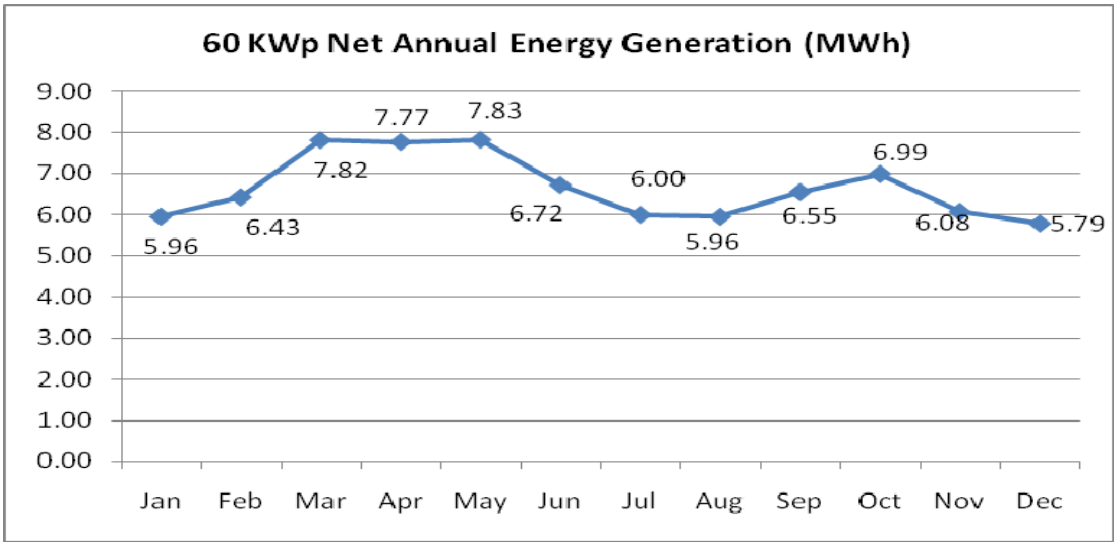

Figure 2: Month wise Energy Generation

The energy available from the Plant would vary from a minimum of 5.79 MWh during the month of December to a maximum of 7.83 MWh during the month of May. The annual capacity utilization factor works out as 18%.

The Energy Generation simulation for the NP Co Ed Primary School Building is given in Annexure-III.

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As per the present market conditions the cost for 60kWp stand alone solar power plant including installation and commissioning is Rs. 1 Lakh/ kWp. Therefore, the cost of 60kWP system is estimated as Rs. 60 Lakh. The detailed specification with Bill of materials giving indicative cost of major equipments is provided in Annexure – IV.

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10.1. Roof Area Availability for Stand Alone Solar Power Plant

The total roof space available at NP Co Ed Primary School Building is about 850 sq meter which is presently vacant and can be utilized for solar roof top system. There is no nearby upcoming project which may block the way of sun the roof space is an ideal place for installation of SPV system. The proposed system of 60 kWp require a roof space of about 800 sq meters, therefore from the available roof space of dimensions (50m x 8m) + (13m x 8m) + (22m x 7m) + (14m x 14m) can be utilized very effectively for the solar power plant installation. The layout of the roof space with orientation is provided in Annexure VI.

Annexure I: Mean Global Solar Radiant Exposure, New Delhi

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Jan	4.37
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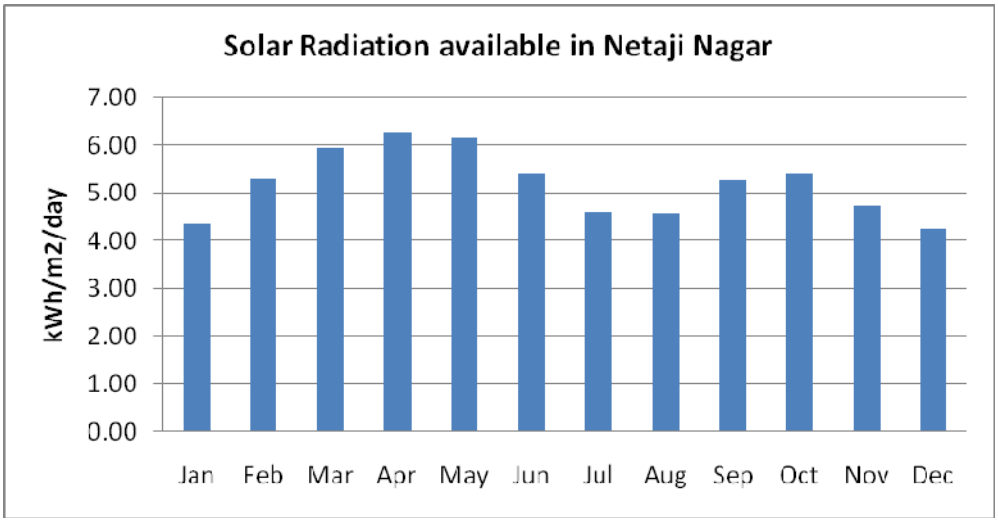
Oct	5.42
Nov	4.75
Dec	4.27
Annual	**5.20**



Annexure II:60 kWp Roof Top Solar PV System at NP Co Ed Primary School Building, New Delhi

Month	Energy Generation (MWh)
Jan	5.959
Feb	6.427
Mar	7.817
Apr	7.771
May	7.825
Jun	6.723
Jul	6.004
Aug	5.955
Sep	6.552
Oct	6.992
Nov	6.076
Dec	5.79
Annual	**79.891**

Annexure III: Energy Generation simulation for the NP Co Ed Primary School Building, New Delhi

	Unit	Climate data location	Project location
Latitude	°N	28.6	28.6
Longitude	°E	77.2	77.2
Elevation	m	216	216
Heating design temperature	°C	7.3	
Cooling design temperature	°C	40.6	
Earth temperature amplitude	°C	23.7	

Month	Air temperature	Relative humidity	Daily solar radiation - horizontal	Atmospheric pressure	Wind speed	Earth temperature	Heating degree-days	Cooling degree-days
	°C	%	kWh/m²/d	kPa	m/s	°C	°C-d	°C-d
January	14.3	70.9%	3.74	99.1	2.2	14.1	115	133
February	16.8	63.0%	4.76	98.9	2.5	18.2	34	190
March	22.3	53.9%	5.89	98.5	2.8	26.0	0	381
April	28.8	39.8%	6.79	98.0	3.1	32.8	0	564
May	32.5	39.7%	6.96	97.6	3.1	36.3	0	698
June	33.4	52.3%	6.30	97.2	3.1	36.1	0	702
July	30.8	70.9%	5.27	97.2	2.5	31.3	0	645
August	30.0	75.7%	5.10	97.4	2.2	29.2	0	620
September	29.5	70.1%	5.46	97.9	2.2	28.0	0	585
October	26.3	62.5%	5.04	98.4	1.7	25.1	0	505
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Analysis type		○ Method 1 ◉ Method 2
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☑ Show data

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March	5.89	5.97		7.817
April	6.79	6.28		7.771
May	6.96	6.16		7.825
June	6.30	5.43		6.723
July	5.27	4.61		6.004
August	5.10	4.58		5.955
September	5.46	5.28		6.552
October	5.04	5.42		6.992
November	4.13	4.75		6.076
December	3.55	4.27		5.790
Annual	**5.25**	**5.20**	**0.00**	**79.891**

Annual solar radiation - horizontal	MWh/m²	1.92
Annual solar radiation - tilted	MWh/m²	1.90

Photovoltaic			
Type		mono-Si	
Power capacity	kW	60.00	
Manufacturer		X	
Model		X	1 unit(s)
Efficiency	%	18.0%	
Nominal operating cell temperature	°C	45	
Temperature coefficient	% / °C	0.40%	
Solar collector area	m²	333	
Miscellaneous losses	%	10.0%	
Inverter			
Efficiency	%	95.0%	
Capacity	kW	60.0	
Miscellaneous losses	%	10.0%	
Summary			
Capacity factor	%	15.2%	
Electricity exported to grid	MWh	79.891	

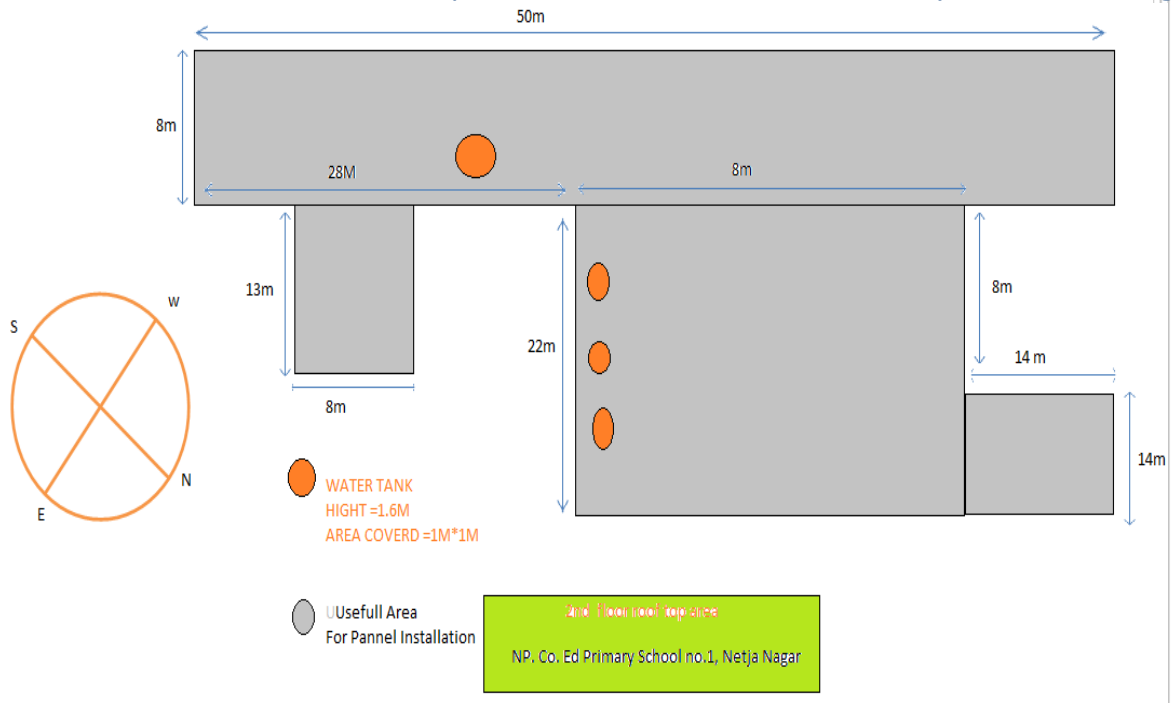
Annexure IV: Bill of Material for 60 kWp Roof top SPV System

Sl. No.	Component Name	Type and / or Model No.	Description of Components	Quantity/ System	60 KW SPV Grid Connected System
1	SPV Module (Poly Crystalline)	240 Wp or equivalent	30 V, 7.8 Amps/ module	Sets of 250 nos. SPV module (84 in parallel and 3 in series)	2,526,316
2	Structure	Module type	MS Hot dip galvanized steel	LS	394,737
3	Inverter Rating	96 V D/C – input 415 V AC – output	11 kVA power rating with synchronizer & meter equipped with data logging facilities	8 no.	710,526
4	Field Junction Box	Reputed make	Dust & water proof		789,474
5	Main Junction Box	Reputed make	Dust & water proof		
6	Ground Fault Protection System		Included at inverter	1 no.	
7	Cables	Conforming to BIS	25 sq mm PVC cables	As per site conditions	
8	Lightening Arresters			1 no.	
9	Earthing	Reputed make		1 set	
	Total Systems Hardware				
10	Civil works and electrical works			LS	394,737
11	Installation and commissioning			LS	394,737
12	Annual Maintenance for 5 years			LS	394,737
13	Transportation and insurance			LS	394,737
	Total				**6,000,000.00**

Annexure V: Reputed Make of Major Equipments for Roof Top SPV System

MNRE Empanelled Manufacturers

Annexure VI: Useable Roof Space Available at NP Co Ed Primary School Building



Note: Dimensions are not to the Scale
The available roof space is 850 sq meter which is more than sufficient for 60kWp roof top SPV system, the total space will be ((50m x 8m) + (13m x 8m) + (22m x 7m) + (14m x 14m) = 854 sq meter

DETAILED PROJECT REPORT

For

Installation & Commissioning
Of
65 kWp Grid Connected Roof Top Solar PV system
Under JNNSM Program

At

NP Girls Middle School, Gole Market,
New Delhi (Delhi)

Prepared for

New Delhi Municipal Council
Delhi.

Prepared by
Darashaw & Company Pvt. Ltd.
December 2013

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65kWp Grid Connected Roof Top Solar Photovoltaic system at NP Girls Middle School, Gole Market, New Delhi

1. INTRODUCTION

Harnessing of non polluting renewable energy resources to control green house gases is receiving impetus from the government of India. The solar mission, which is part of the National Action Plan on Climate Change has been set up to promote the development and use of solar energy in for power generation and other uses with the ultimate objective of making solar energy competitive with fossil-based energy options. The mission is a major initiative of the Government of India and State Governments to promote ecologically sustainable growth while addressing India's energy security challenge. It will also constitute a major contribution by India to the global effort to meet the challenges of climate change. The solar photovoltaic device systems for power generation had been deployed in the various parts in the country for electrification where the grid connectivity is either not feasible or not cost effective as also some times in conjunction with diesel based generating stations in isolated places and communication transmitters at remote locations.

The immediate aim of the Mission is to focus on setting up an enabling environment for solar technology penetration in the country both at a centralized and decentralized level. The first phase (up to March 2013) will, inter alia, focus on promoting grid connected systems.

With the downward trend in the cost of solar energy and appreciation for the need for development of solar power, solar power projects have recently been implemented. A significant part of the large potential of solar energy in the country could be developed by promoting solar photovoltaic power systems of varying sizes as per the need, affordability and area availability kilowatt level solar photovoltaic power plant of adequate capacity can be proposed for the location.

It has been proposed to set up a **65 kWp** stand alone solar photovoltaic system on the roof top of NP Girls Middle School Building which will generate power and supplied to the grid.

The **65 kWp** Solar PV System to be installed in school is estimated to generate of **91.357 MWh** and operate at a capacity factor of 18%. The SPV system estimated to cost **Rs 65 lakh** including the cost of installation and commissioning.

2. OBJECTIVES OF THE PROGRAMME

The objectives are as follows:

- To promote grid applications of solar energy for meeting the targets set in the Jawaharlal Nehru National Solar Mission for Phase-I.
- To create awareness and to demonstrate effective and innovative use of Solar systems for individual, community, institutional and industrial applications.
- To encourage innovation in addressing market needs and promoting sustainable business models.
- To provide support to channel partners and potential beneficiaries, within the framework of boundary conditions and in a flexible demand driven mode.
- To create a paradigm shift needed for commoditization of grid decentralized solar applications.
- To support consultancy services, seminars, symposia, capacity building, awareness campaigns, human resource development, etc.
- To encourage replacement of kerosene& diesel, wherever possible.

3. SCOPE OF THE SCHEME

The scheme would be applicable to all parts of India and would, to begin with, be co-terminus with Phase-I of the Jawaharlal Nehru National Solar Mission and will, inter alia, focus on promoting grid connected and decentralized systems.

Various grid connected solar photo voltaic systems / applications up to a maximum capacity of 100 kWp per site and decentralized solar thermal applications, to meet / supplement lighting, electricity/power, heating and cooling energy requirements would be eligible for being covered under the Scheme.

4. SALIENT FEATURES

1. Location

i.	State	New Delhi
ii.	City	New Delhi
iii.	Location	New Delhi Municipal Council
iv.	Latitude	28° 61' 00" N
v.	Longitude	77° 23' 00" E

2. Area and Type for SPV Plant

i.	Area	980 sq meter
ii.	Type	Roof Top System
iii.	Specific Location	On roof top of the NP Girls Middle School

3. SPV Power Plant

i.	Capacity	65 kWp
ii.	No. of modules	250
iii.	Connections	in series 3 in parallel 84
iv.	DC BUS	1 No.

4. Technical details of a SPV Module

a) PV Module type Poly crystalline

b) Electrical Parameter

i.	Maximum Power Rating	250 Wp
ii.	Rated Current	4.25 A
iii.	Rated Voltage	12 V
iv.	Short Circuit Current	5 A

v. Open Circuit Voltage 21 V

5. Mounting Arrangement

i. Mounting Fixed Type
ii. Tilt angle(slope) 40°
iii. Position Roof Top mounted

6. Inverter/ Power Conditioning Unit (PCU)

i. Number of units 1
ii. Rated Capacity 80 kVA
iii. Input Voltage range 170 V (Max.)
iv. Output Voltage 415 V AC
v. Frequency 50 Hz
vi. Efficiency 95%

7. Grid Connection Details

i. Electrical parameters for interconnection 415 V, 3Ph ,50 Hz

8. Annual Energy Generation

i. Annual Energy 91.357 MWh

9. Cost Estimate

i. Estimated Cost Solar PV System Rs. 65.00 lakh

10. Construction Time 8 months

5. PROJECT PROPOSAL

As per the observation based on the data collected on area availability and shadow free area of 980 sq meter, it is proposed to install around 65 KWp grid connected Solar PV system in the roof top of NP Girls Middle school.

NP Girls Middle School Building has an open roof space of 980 sq meter which can be utilized for solar PV system. It is proposed to install a 65 kWp Solar PV Roof Top System on the open space available at the roof top. The system will be connected to available grid and the generated electricity will be connected to grid. NDMC will sign Power Purchase Agreement (PPA) of preferential tariff to supply the generated power to the grid.

Figure 1: Roof top Picture of the NP Girls Middle School

The **65 kWp** SPV system at roof-top of NP Girls Middle School is estimated to afford annual energy generation of **91.357 MWh** (i.e. 0.091 million units) and operate at a capacity factor of 18%. The SPV system estimated to cost Rs. 1 Lakhs/ kWp without battery bank for which 30% capital Subsidy is available from MNRE. If the utility is installing grid connected solar PV system to meet the RPO obligation, it has two options to avail. It would be either 30% capital subsidy or else they can avail REC benefits. But the utility cannot avail both the benefits of subsidy and REC.

The total system cost for NDMC, New Delhi will be **Rs. 65 Lakh**, which will include system cost with installation and commissioning.

6. SITE DESCRIPTION

The NDMC has sufficient vacant roof top space without any obstacle for sunlight, which can be used for Solar PV installations. It is proposed to utilize a vacant area available of about 980 sq meters on this roof top to accommodate a cumulative capacity of 65 kWp of solar PV modules.

The above mentioned grid connected power plant would also be considered as the demonstration system and for public awareness.

7. FUNCTIONAL DESCRIPTION OF SPV POWER SYSTEM

The solar PV system shall be designed with either mono/ poly crystalline silicon modules or using thin film photovoltaic cells or any other superior technology having higher efficiency.

Three key elements in a solar cell form the basis of their manufacturing technology. The first is the semiconductor, which absorbs light and converts it into electron-hole pairs. The second is the semiconductor junction, which separates the photo-generated carriers (electrons and holes), and the third is the contacts on the front and back of the cell that allow the current to flow to the external circuit. The two main categories of technology are defined by the choice of the semiconductor: either crystalline silicon in a wafer form or thin films of other materials.

The stand alone roof top solar PV system generally comprises the following equipment.

I. Solar Panels (PV) Modules
II. Charge Controllers
III. Inverters
IV. Battery Bank
V. Mounting Structure
VI. AC and DC Cables
VII. Earthing equipment /material
VIII. Junction Boxes or combiners
IX. Instruments and protection equipments

7.1. Solar Panels (PV) Modules

The DC electricity produced by the solar panel or module(s) is used to charge batteries via a solar charge controller. Any DC appliances that are connected to the battery will need to be fused. DC lights are normally connected to the charge controller. Any AC appliances are powered via an inverter connected directly to the batteries. NOTE: inverters used in grid tie and stand alone systems are different and should not be interchanged.

Most Stand Alone PV Systems need to be managed properly. Users need to know the limitations of a system and tailor energy consumption according to how sunny it is and the State of Charge (SOC) of the battery.

7.2. Configuration

The solar panels need to be configured to match the system DC voltage, which is determined by the battery. System voltages are typically, 12V DC and 24V DC, larger systems will operate at 48V DC.

The operating voltage of a solar panel in a stand-alone system must be high enough to charge the batteries. For example, a 12V battery will require 14.4V to charge it. The solar panel must be able to deliver this voltage to the battery after power losses and voltage drop in the cables and charge controller and in conditions in which the solar cells operate at a high temperature. A solar panel with a Voc of about 20V is required to reliably charge a 12V battery.

7.3. Charge Controllers

A charge controller is designed to protect the battery and ensure it has a long working life without impairing the system efficiency. Batteries should not be overcharged and the function of the charge controller is to ensure that the battery is not over charged. Charge controllers are designed to function as follows:

- Protect the battery from over-discharge, normally referred to as Low Voltage Disconnect (LVD) that disconnects the battery from the load when the battery reaches a certain depth of discharge (DOD).
- Protect the battery from over-charging by limiting the charging voltage – this is important with sealed batteries – it is usually referred to as High Voltage Disconnect (HVD).
- Prevent current flowing back into the solar panel during the night, so called reverse current.

7.4. Inverters

Inverters are used for DC voltage to AC voltage conversion. Inverter input voltage depends on inverter power, for small power of some 100 W the voltage is 12 or 24 V, and

48 V or even more for higher powers. For large systems 3-phase inverters are available. Storage batteries use and store DC – Direct Current and have a low voltage output usually in the range of 12 – 24 volts. Virtually all modern appliances operate on AC – Alternating Current and work on 240 volts. An inverter is a device that takes the power from your DC battery source and through special technology boosts it to household AC electricity giving you the power to run appliances such as televisions, lights, computers, and power tools wherever you may be. Simply, an inverter increases 12/24/48-volt battery power to 110/240 AC power.

7.5. Battery Bank

The power requirements of stand alone PV systems are rarely in sync with the battery charging. Appliances and loads need to be powered when there is sufficient solar radiation, during overcast weather and during the night. Bad weather may last for several days and the daily charging and discharging of the batteries takes its toll on them. Batteries that are able to handle the constant charging and discharging are known as deep cycle batteries. Batteries need to have a good charging efficiency, low charging currents and low self-discharge.

7.6. Cables and Accessories

Cables need to be UV resistant and suitable for outdoor applications. It is very important to keep power losses and voltage drop in the cable to a minimum. It is recommended that this be less than 3% between the array and the batteries and less than 5% between the battery and DC loads.

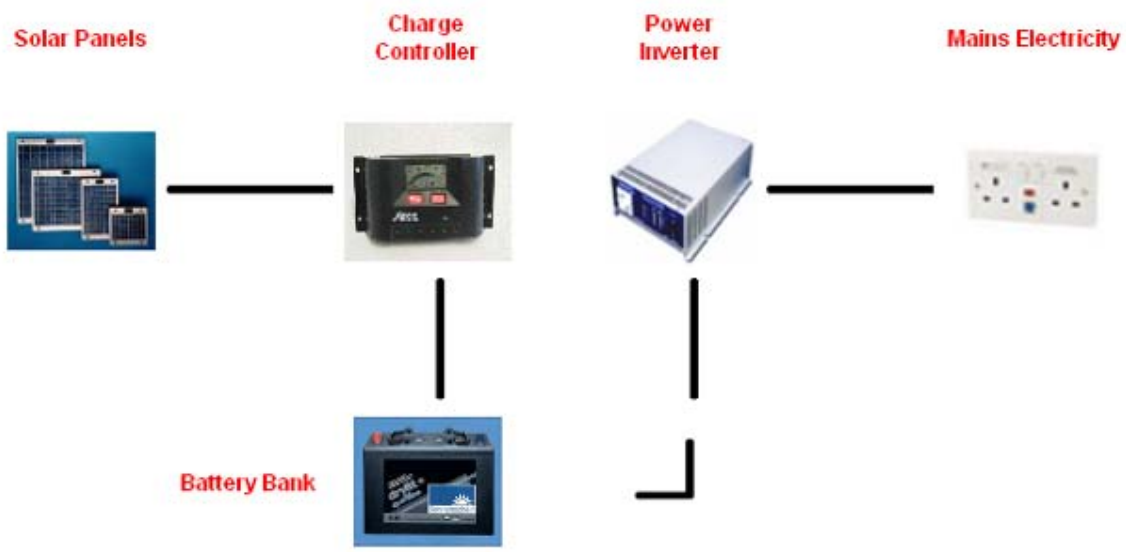


Figure 2: Components of a Stand Alone Solar PV System

8. ANNUAL ENERGY GENERATION

The annual energy generation from the SPV power plant has been worked out based on the data on mean global solar radiant exposure over Delhi. The mean global solar radiant exposure varies from 4.27 kWh/m^2/day in the month of December to 6.28 kWh/m^2/day in the month of April. The month-wise mean global solar radiant exposure is given at Annexure-I. Considering the efficiency of PV module at 18% and temperature coefficient of 0.4 % per °C, the annual energy generation is estimated as 91.357 MWh (i.e. 0.0914 million units). This takes into consideration an efficiency of the Power Conditioning Unit (PCU) as 95% and losses in the DC and AC system as 4% each up to the point of interconnection. The month wise energy generation during the year is given at Annexure-II and shown below.

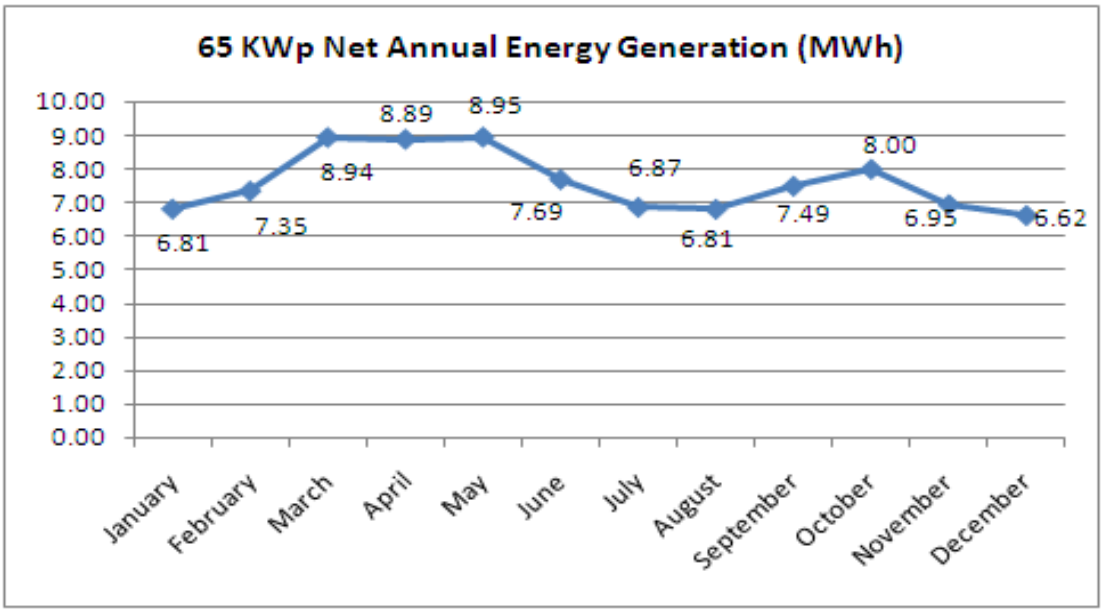


Figure 3: Month wise Energy Generation

The energy available from the Plant would vary from a minimum of 6.62 MWh during the month of December to a maximum of 8.95 MWh during the month of May. The annual capacity utilization factor works out as 18%.

The Energy Generation simulation for the NP Girls Middle Building is given in Annexure-III.

9. ESTIMATES OF COST

9.1. Stand Alone Solar PV Power Plant

As per the present market conditions the cost for 65kWp stand alone solar power plant including installation and commissioning is Rs. 1 Lakh/ kWp. Therefore the cost of 65kWP system is estimated as Rs. 65 Lakh. The detailed specification with Bill of materials giving indicative cost of major equipments is provided in Annexure – IV.

The reputed make of the major equipments for standalone solar PV roof top system is provided in Annexure – V.

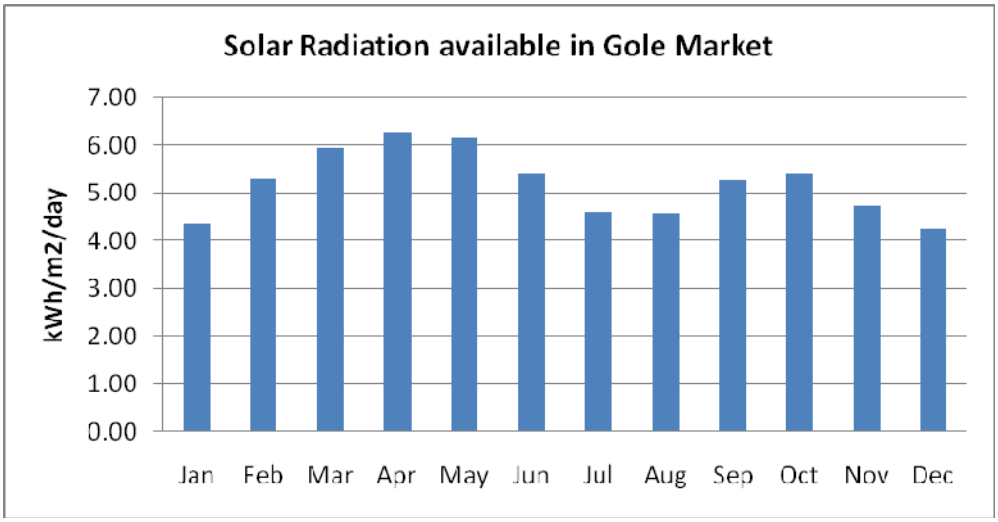
10. AREA AVAILABILITY

10.1. Roof Area Availability for Stand Alone Solar Power Plant

The total roof space available at NP Girls Middle School Building is about 980 sq meter which is presently vacant and can be utilized for solar roof top system. There is no nearby upcoming project which may block the way of sun the roof space is an ideal place for installation of SPV system. The proposed system of 65 kWp require a roof space of about 900 sq meters, therefore from the available roof space of dimensions (34m x 16m) + (21m x 16m) + (21m x 5m) can be utilized very effectively for the solar power plant installation. The layout of the roof space with orientation is provided in Annexure VI.

Annexure I: Mean Global Solar Radiant Exposure, New Delhi

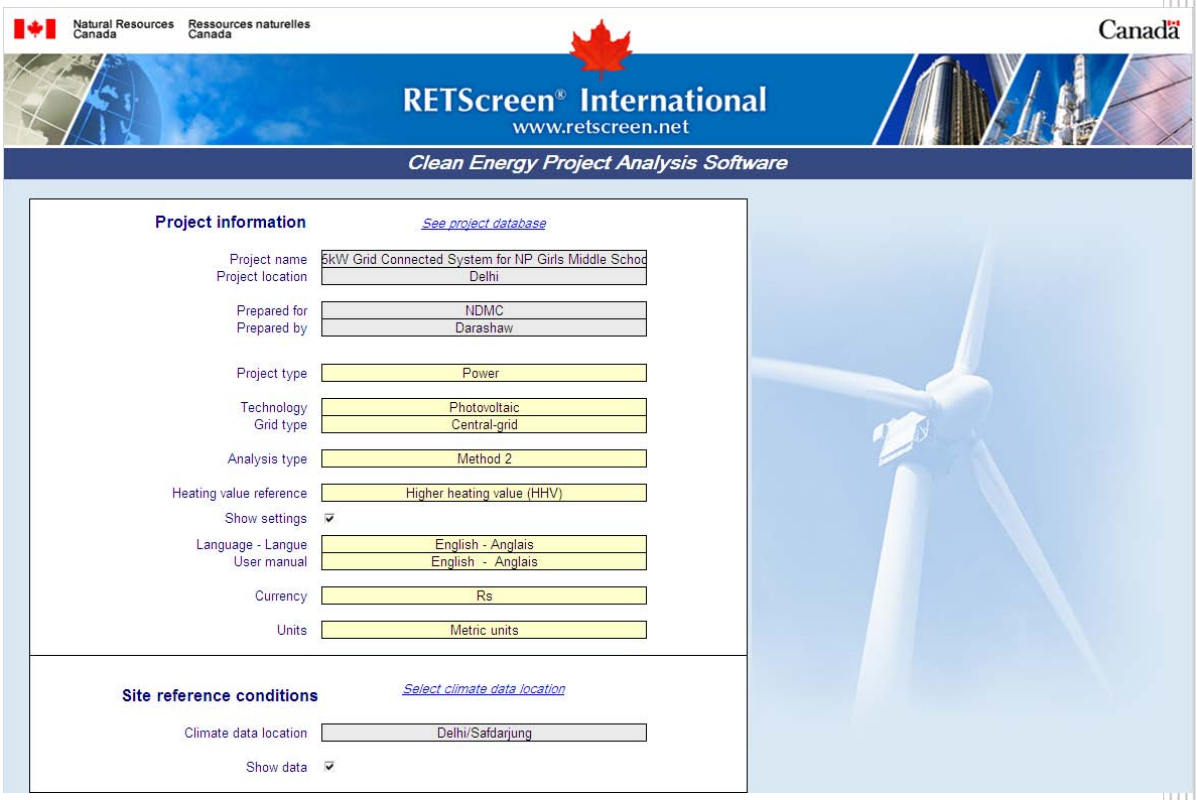
Month	Daily solar radiation - horizontal kWh/m²/d
Jan	4.37
Feb	5.30
Mar	5.97
Apr	6.28
May	6.16
Jun	5.43
Jul	4.61
Aug	4.58
Sep	5.28
Oct	5.42
Nov	4.75
Dec	4.27
Annual	**5.20**



Annexure II:65 kWp Roof Top Solar PV System at NP Girls Middle School Building, New Delhi

Month	Energy Generation (MWh)
Jan	6.814
Feb	7.350
Mar	8.939
Apr	8.886
May	8.948
Jun	7.688
Jul	6.866
Aug	6.809
Sep	7.492
Oct	7.995
Nov	6.948
Dec	6.621
Annual	**91.357**

Annexure III: Energy Generation simulation for the NP Girls Middle School Building, New Delhi



	Unit	Climate data location	Project location
Latitude	°N	28.6	28.6
Longitude	°E	77.2	77.2
Elevation	m	216	216
Heating design temperature	°C	7.3	
Cooling design temperature	°C	40.6	
Earth temperature amplitude	°C	23.7	

Month	Air temperature	Relative humidity	Daily solar radiation - horizontal	Atmospheric pressure	Wind speed	Earth temperature	Heating degree-days	Cooling degree-days
	°C	%	kWh/m²/d	kPa	m/s	°C	°C-d	°C-d
January	14.3	70.9%	3.74	99.1	2.2	14.1	115	133
February	16.8	63.0%	4.76	98.9	2.5	18.2	34	190
March	22.3	53.9%	5.89	98.5	2.8	26.0	0	381
April	28.8	39.8%	6.79	98.0	3.1	32.8	0	564
May	32.5	39.7%	6.96	97.6	3.1	36.3	0	698
June	33.4	52.3%	6.30	97.2	3.1	36.1	0	702
July	30.8	70.9%	5.27	97.2	2.5	31.3	0	645
August	30.0	75.7%	5.10	97.4	2.2	29.2	0	620
September	29.5	70.1%	5.46	97.9	2.2	28.0	0	585
October	26.3	62.5%	5.04	98.4	1.7	25.1	0	505
November	20.8	63.7%	4.13	98.9	1.4	20.1	0	324
December	15.7	70.1%	3.55	99.1	1.9	15.2	71	177
Annual	25.1	61.1%	5.25	98.2	2.4	26.1	220	5,524
Measured at	m				10.0	0.0		

Complete Energy Model sheet

RETScreen Energy Model - Power project

Proposed case power system

Technology		Photovoltaic
Analysis type		○ Method 1 ◉ Method 2
Resource assessment		
Solar tracking mode		Fixed
Slope	°	40.0
Azimuth	°	60.0

☑ Show data

Month	Daily solar radiation - horizontal kWh/m²/d	Daily solar radiation - tilted kWh/m²/d	Electricity export rate Rs/MWh	Electricity exported to grid MWh
January	3.74	4.37		6.814
February	4.76	5.30		7.350
March	5.89	5.97		8.939
April	6.79	6.28		8.886
May	6.96	6.16		8.948
June	6.30	5.43		7.688
July	5.27	4.61		6.866
August	5.10	4.58		6.809
September	5.46	5.28		7.492
October	5.04	5.42		7.995
November	4.13	4.75		6.948
December	3.55	4.27		6.621
Annual	**5.25**	**5.20**	**0.00**	**91.357**

Annual solar radiation - horizontal	MWh/m²	1.92
Annual solar radiation - tilted	MWh/m²	1.90

Photovoltaic

Type		poly-Si
Power capacity	kW	65.00
Manufacturer		X
Model		X (1 unit(s))
Efficiency	%	18.0%
Nominal operating cell temperature	°C	45
Temperature coefficient	% / °C	0.40%
Solar collector area	m²	361
Miscellaneous losses	%	5.0%

Inverter

Efficiency	%	95.0%
Capacity	kW	65.0
Miscellaneous losses	%	10.0%

Summary

Capacity factor	%	16.0%
Electricity exported to grid	MWh	91.357

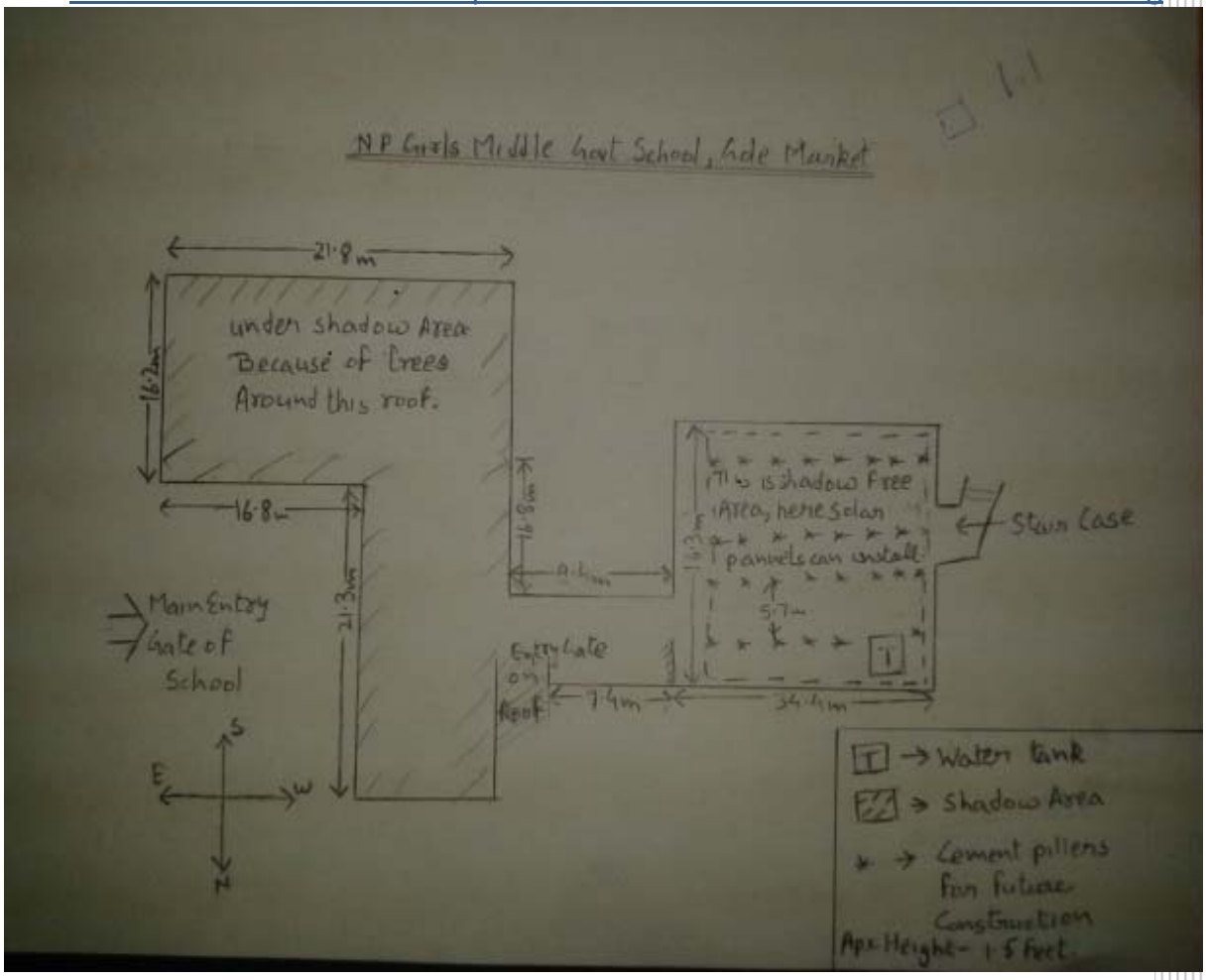
Annexure IV: Bill of Material for 65 kWp Roof top SPV System

Sl. No.	Component Name	Type and / or Model No.	Description of Components	Quantity/ System	65 KW SPV Grid Connected System
1.	SPV Module (Poly Crystalline)	240 Wp or equivalent	30 V, 7.8 Amps/ module	Sets of 250 nos. SPV module (84 in parallel and 3 in series)	2,736,842.11
2.	Structure	Module type	MS Hot dip galvanized steel	LS	427,631.58
3.	Inverter Rating	96 V D/C – input 415 V AC – output	11 kVA power rating with synchronizer & meter equipped with data logging facilities	8 no.	769,736.84
4	Field Junction Box	Reputed make	Dust & water proof		855,263.16
5	Main Junction Box	Reputed make	Dust & water proof		
6	Ground Fault Protection System		Included at inverter	1 no.	
7	Cables	Conforming to BIS	25 sq mm PVC cables	As per site conditions	
8	Lightening Arresters			1 no.	
9	Earthing	Reputed make		1 set	
	Total Systems Hardware				
10	Civil works and electrical works			LS	427,631.58
11	Installation and commissioning			LS	427,631.58
12	Annual Maintenance for 5 years			LS	427,631.58
13	Transportation and insurance			LS	427,631.58
	Total				**6,500,000.00**

Annexure V: Reputed Make of Major Equipments for Roof Top SPV System

MNRE Empanelled Manufacturers

Annexure VI: Useable Roof Space Available at NP Girls Middle School Building



Note: Dimensions are not to the Scale
The available roof space is 980 sq meter which is more than sufficient for 65kWp roof top SPV system, the total space will be (39 X 19) + (20 X 12) +(14 X 13.2) = 980 sq meter

Annexure VII: Snapshots of Roof Space Available at NP Girls Middle School Building

Proposal for

130 kW Roof Top Solar Power Plant at Navyug Education Society School, New Delhi.

Submitted by:

New Delhi Municipal Council

Submitted to:

Ministry of New & Renewable Energy

Ministry of New and Renewable Energy
Jawaharlal Nehru National Solar Mission
(Grid Connected Solar Applications)
Project Proposals: Stand Alone SPV Power Plants

1. **Title of the Project : 130kW Roof Top Solar PV plant for Navyug Education Society School building**

2. **Name of the Project Proponent : New Delhi Municipal Council (NDMC)**

3. **Socio- Economic Justification of the Project:**

The New Delhi Municipal Council area comprises of the territory that has been described as Lutyen's Delhi and which has historically come to be regarded as the seat of central authority in Union of India. It comprises of important buildings like Rashtrapati Bhawan, Parliament House, Supreme Court, North and South Blocks and buildings abutting Central Vista and also all the diplomatic missions which function as territorial entities under the sovereign jurisdiction of their Flag States. The Government of India is nearly the sole landowner and also owns about eighty percent of the buildings in the New Delhi Municipal Council area. Private ownership of property in this area is marginal. Efficient function of the Municipal services in this area is critical for the internal image of the country and is a factor which has an important bearing on the functioning of the Government apparatus itself. The grid connected solar PV power plant installed in the rooftop of the building will supply the generated power to the grid. The project would not only help savings of precious fossil fuel but will also act as a good demonstration project for the local citizens.

4. **Benefits of the Proposed Project**

- The proposed Grid Connected project of 130 KWp roof top SPV power plants will help in reducing the power demand of the New Delhi City.
- The project will also help in meeting NDMC Solar RPO Obligations.
- The project being situated in the NCR region also act as a focal point of awareness and demonstration project which can be shown to various stakeholders of NDMC area and which can later be replicated.

PART-A: Details of the Project Proponent

i.	Name of the Project Proponent Category of the Project Proponent	**New Delhi Municipal Council (NDMC)** **Deputy Director**
ii.	Name, Designation and Address of the Authorized Representative for Correspondence with telephone no., fax & email	**Add NDMC Contact Name and Address** **Director, NDMC** **Palika Kendra,** **Parliament Street,** **New Delhi-110001**
iii	In case of Channel Partner other than Programme Administrator, the following information will be provided: a) Whether commercial or non-commercial. b) Copy of Articles of Association, Registration No. & Date; PAN/ TAN No. c) Audited Balance Sheet for last three years d) Annual Report of previous year e) Whether MNRE has earlier sanctioned any SPV projects for implementation to the Project Proponent, if yes, please furnish information	**NA**
iv	In case of 1 (e), Please indicate: a) Government Department, Autonomous Institution set up by Central/ State Government, State renewable Energy development agency, Public Sector Undertaking b) Others	**Govt. Body**

PART-B: Details of the Project

1. Summary of the Proposal:

NDMC has taken up the project under the Solar City Scheme of MNRE. The draft Master Plan has already been prepared and the same will be presented before the stakeholder committee.

NDMC now wants to take up certain renewable energy projects on priority basis and as such it is interested in setting up of a 130 kWp grid connected solar photovoltaic system (fixed) on the roof top of the Navyug Education Society School Building, New Delhi. The 130 kWp SPV system at roof-top of the building is estimated to afford annual energy generation of 173 MWh (i.e. 0.173 million units).

2. Details of the Project Site:

State	:	New Delhi
District	:	New Delhi
City	:	New Delhi
Building	:	Navyug Education Society School Building, Hanuman Road, New Delhi

The School Building has sufficient vacant roof top space available without any obstacle. A pictorial representation of the terraces showing the total available area, area utilized by solar panels and the framework in which the panels may be implemented is detailed in Annexure VI of the DPR enclosed:

It is proposed to utilize a vacant area available of about 2000 square meters on these terraces to accommodate a cumulative capacity of 130 kWp of solar PV modules. The total number of 250 watt solar panels to be accommodated on the terraces is shown in detail in Annexure VI of DPR enclosed along with this proposal.

3. Details of Project Beneficiary:

The NDMC area bounded by the junction of Pusa Road and Upper Ridge Road towards east along the New Link Road, the Panchkuian Road upto its junction with the Old Gurgaon Road; thence towards northeast along the Old Gurgaon Road and Chelmsford Road upto the New Delhi Railway Station; thence towards south and south east along the railway line upto its junction with the Hardings Bridge; thence towards south along the Mathura Road; upto its junction with Lodhi Road; thence towards south along the Lodhi Road; upto its junction with the first road leading to Lodhi Colony; thence towards south along the first road leading to Lodhi Colony upto its junction with the Ring Railway; hence towards south along the railway line upto its junction with Qutab Road; thence towards south along the Qutab Road upto to its junction with Kushak Nallaha; thence towards east along the Kaushak Nulla up to its junction with the Boundary of the Corporation and along the south boundary of the Medical Enclave upto its junction with the Ring Road near Gawalior Potteries; thence towards north-west along the Ring Road upto its junction with Kitchner Road, thence towards north along the Upper Ridge up to the starting point.

The Power generated from the proposed power 130 kW power plant will meet electrical loads of lighting and fan and other loads of selected appliances in the building.

4. Details of the Proposed Power Plant:

I.	Proposed capacity of the SPV Power Plant	130 kW
II.	Availability of shadow free land area for the power plant	2355 Sq Mtr
III.	Details of loads to be energized by Power Plant, calculations and justification for the proposed capacity and expected annual energy generation	Explained in detail in section 6 of the DPR enclosed
The proposed 130 KWp Solar PV is grid-connected where the available roof-top of the school building will be utilized for installation. The annual energy generation from 130 KWp Solar PV is 173 MWh (i.e. 0.173 million units). The same has been estimated based on the data from RET software as shown below:		
IV.	Output Voltage of the Power Plant	220 V AC
V.	Inverter Rating Capacity	400 AH / 6V

System Components	Capacity	Numbers	Indigenous /Imported
Solar PV Module As per IEC61215/IS14286	250 watts	250 nos.	Indigenous
Solar Inverter with Charge Controller As per IEC61683/Equivalent	60VDC, 70kVA Inverter with 220VAC, 2 number of 60A MPPT charge controller	01 nos.	Indigenous
Data Logger with GPRS Remote Monitoring facility for AC & DC Parameter with 2 Yrs Free Servicing	-	01 nos.	Indigenous
Net Metering System		01 nos.	Indigenous

PART-C: Implementation Schedule

1. Major Monitorable Milestone:

a. Finalization of the system size and power load

b. Submission of the Project Report in the prescribed format

c. Sanction form MNRE

d. Selection of supplier

e. Implementation of the Project

f. Oversight of proper functioning of the system

g. Release of payment to the system supplier

2. Project Commissioning Time Line

a.	Submission of Project report to MNRE	-	15 days
b.	Sanction from MNRE	-	45 days
c.	Selection of Supplier	-	45 days
d.	Implementation of Project	-	135 days
	Total	-	240 days

PART-D: Performance Monitoring Mechanism:

Performance Data Monitoring (Daily, Monthly and Annual energy generation ,logging, compilation and sharing with MNRE)	A Data Logger with GPRS Remote Monitoring facility for AC & DC Parameter will be installed
Monthly monitoring of reduction in diesel consumption, if any.	Data card of the diesel consumption will be maintained to ascertain the annual savings.
Own Mechanism	Data card of the diesel consumption will be maintained to ascertain the annual savings.
Third Party	MNRE
Remote Monitoring (for SPV power plants having capacity above 5 kWp)	Data Logger will be used

PART-E: Project cost and Financing Details:

Project Cost:

i. Cost of Systems Hardware	**Rs. 95.79 Lakh**
ii. Cost of transportation and insurance	**Rs. 8.55 Lakh**
iii. Cost of civil works and electrical works	**Rs. 8.55 Lakh**
iv. Cost of installation and commissioning	**Rs. 8.55 Lakh**
v. Cost of Annual Maintenance for 5 years	**Rs. 8.55 Lakh**
vi. Any other related cost	**NA**
Total Cost of Power Plants	**Rs.130 Lakh**
Total kWp SPV Capacity	**130 kWp**
Means of Finance	
a) Contribution of Project Proponent	**Rs.91,00,000 (70% of the project cost)**
b) Contribution of Beneficiaries organization	**NA**
c) Envisaged CFA from MNRE	**Rs 39,00,000 (30% of the project cost)**
d) Other Source (s) of Funding (capital grant)	**NA**
e) Envisaged Soft Loan assistance, if any	**NA**
f) Whether funds are in surplus or deficiency	**Funds are adequate to meet the project cost**
Details of Project revenue recurring , if any	**NA**
Project Duration	**8 Months**

PART-F: Operation & Maintenance Arrangements:

Details of Operation & Maintenance Arrangements

- NDMC will enter into a specific 5 years maintenance contract with the equipment supplier.
- Assistance will also be availed from MNRE or State Nodal Agency engineers from time to time as and when required.
- The electrical engineers of NDMC will also look after the day to day maintenance of the plant.

PART G: Declarations and Certificates

a. It is certified that I/we have read the guidelines issued by the Ministry vide 5/23/2009/P&C dated 16th June, 2010 and the related provisions/terms and conditions for availing financial support from the Ministry of New and Renewable Energy and I agree to abide by these guidelines and related terms and conditions.

b. I understand that failure to comply by these guidelines may result in denial of financial support by the Ministry.

c. I confirm that the present proposal in full or part has not been submitted / has been submitted to any other agency for seeking support (In case proposal has been submitted to any other agency or under consideration all details and a copy of the proposal must be submitted along with the present proposal).

d. I confirm that I will not submit the same proposal or a part thereof to any other funding agency, without prior knowledge of the Ministry of New and Renewable Energy.

e. I confirm that the share of project proponent/beneficiaries shall not be lower than 20% in any circumstances. Projects owned by the Programme Administrators are exempt from this condition.

f. I confirm that the proposed solar PV system(s) have not been installed/supplied at the proposed sites or to the proposed beneficiaries, prior to the receipt of project sanction letter from the Ministry.

g. There is no duplication in the proposal and the submitted proposal is the only proposal by the proponent and to the best of my/ our knowledge no other organization has submitted any proposal for the systems at these site(s) to MNRE for financial support.

h. A detailed site survey has been done/or will be undertaken to identify the beneficiaries before actual supply and installation takes place.

i. This is to certify that the various components of the SPV systems will conform to the Relevant Standards, as mentioned in the Guidelines for grid connected and Decentralized Solar Applications (Annexure-3) for SPV modules and components under JNNSM. Copies of the Relevant IEC/ BIS Certificates should be enclosed.

j. It is mandatory to provide technical performance specifications of each category of system proposed to be supplied under the project and for which the performance will be warranted.

k. All technical parameters and warranty requirements must meet or exceed the requirements mentioned in the guidelines issued by the Ministry.

l. I confirm that in case of any dispute, the decision of Secretary, Ministry of New and Renewable Energy, Government of India will be final and binding on all.

Signature _____

Name & Designation of Authorized Signatory

……

Seal

Place:

Date:

Proposal for

65 kW Roof Top Solar Power Plant at NP Girls Middle School, New Delhi.

Submitted by:

New Delhi Municipal Council

Submitted to:

Ministry of New & Renewable Energy

Ministry of New and Renewable Energy

Jawaharlal Nehru National Solar Mission
(Grid Connected Solar Applications)
Project Proposals: Stand Alone SPV Power Plants

1. Title of the Project : 65 kW Roof Top Solar PV plant for NP Girls Middle School building

2. Name of the Project Proponent : New Delhi Municipal Council (NDMC)

3. Socio- Economic Justification of the Project:

The New Delhi Municipal Council area comprises of the territory that has been described as Lutyen's Delhi and which has historically come to be regarded as the seat of central authority in Union of India. It comprises of important buildings like Rashtrapati Bhawan, Parliament House, Supreme Court, North and South Blocks and buildings abutting Central Vista and also all the diplomatic missions which function as territorial entities under the sovereign jurisdiction of their Flag States. The Government of India is nearly the sole landowner and also owns about eighty percent of the buildings in the New Delhi Municipal Council area. Private ownership of property in this area is marginal. Efficient function of the Municipal services in this area is critical for the internal image of the country and is a factor which has an important bearing on the functioning of the Government apparatus itself. The grid connected solar PV power plant installed in the rooftop of the building will supply the generated power to the grid. The project would not only help savings of precious fossil fuel but will also act as a good demonstration project for the local citizens.

4. Benefits of the Proposed Project

- The proposed Grid Connected project of 65 KWp roof top SPV power plants will help in reducing the power demand of the New Delhi City.
- The project will also help in meeting NDMC Solar RPO Obligations.
- The project being situated in the NCR region also act as a focal point of awareness and demonstration project which can be shown to various stakeholders of NDMC area and which can later be replicated.

PART-A: Details of the Project Proponent

i.	Name of the Project Proponent Category of the Project Proponent	**New Delhi Municipal Council (NDMC)** **Deputy Director**
ii.	Name, Designation and Address of the Authorized Representative for Correspondence with telephone no., fax & email	**Add NDMC Contact Name and Address** **Director, NDMC** **Palika Kendra,** **Parliament Street,** **New Delhi-110001**
iii	In case of Channel Partner other than Programme Administrator, the following information will be provided: a) Whether commercial or non-commercial. b) Copy of Articles of Association, Registration No. & Date; PAN/ TAN No. c) Audited Balance Sheet for last three years d) Annual Report of previous year e) Whether MNRE has earlier sanctioned any SPV projects for implementation to the Project Proponent, if yes, please furnish information	**NA**
iv	In case of 1 (e), Please indicate: a) Government Department, Autonomous Institution set up by Central/ State Government, State renewable Energy development agency, Public Sector Undertaking b) Others	**Govt. Body**

PART-B: Details of the Project

1. Summary of the Proposal:

NDMC has taken up the project under the Solar City Scheme of MNRE. The draft Master Plan has already been prepared and the same will be presented before the stakeholder committee.

NDMC now wants to take up certain renewable energy projects on priority basis and as such it is interested in setting up of a 65 kWp grid connected solar photovoltaic system (fixed) on the roof top of the NP Girls Middle School Building, New Delhi. The 65 kWp SPV system at roof-top of the building is estimated to afford annual energy generation of 91.357 MWh (i.e. 0.0913 million units).

2. Details of the Project Site:

State	:	New Delhi
District	:	New Delhi
City	:	New Delhi
Building	:	NP Girls Middle School Building, Gole Market, New Delhi

The School Building has sufficient vacant roof top space available without any obstacle. A pictorial representation of the terraces showing the total available area, area utilized by solar panels and the framework in which the panels may be implemented is detailed in Annexure VI of the DPR enclosed:

It is proposed to utilize a vacant area available of about 900 square meters on these terraces to accommodate a cumulative capacity of 65 kWp of solar PV modules. The total number of 250 watt solar panels to be accommodated on the terraces is shown in detail in Annexure VI of DPR enclosed along with this proposal.

3. Details of Project Beneficiary:

The NDMC area bounded by the junction of Pusa Road and Upper Ridge Road towards east along the New Link Road, the Panchkuian Road upto its junction with the Old Gurgaon Road; thence towards northeast along the Old Gurgaon Road and Chelmsford Road upto the New Delhi Railway Station; thence towards south and south east along the railway line upto its junction with the Hardings Bridge; thence towards south along the Mathura Road; upto its junction with Lodhi Road; thence towards south along the Lodhi Road; upto its junction with the first road leading to Lodhi Colony; thence towards south along the first road leading to Lodhi Colony upto its junction with the Ring Railway; hence towards south along the railway line upto its junction with Qutab Road; thence towards south along the Qutab Road upto to its junction with Kushak Nallaha; thence towards east along the Kaushak Nulla up to its junction with the Boundary of the Corporation and along the south boundary of the Medical Enclave upto its junction with the Ring Road near Gawalior Potteries; thence towards north-west along the Ring Road upto its junction with Kitchner Road, thence towards north along the Upper Ridge up to the starting point.

The Power generated from the proposed power 65 kW power plant will meet electrical loads of lighting and fan and other loads of selected appliances in the building.

4. Details of the Proposed Power Plant:

I.	Proposed capacity of the SPV Power Plant	65 kW
II.	Availability of shadow free land area for the power plant	980 Sq Mtr
III.	Details of loads to be energized by Power Plant, calculations and justification for the proposed capacity and expected annual energy generation	Explained in detail in section 6 of the DPR enclosed
The proposed 65 KWp Solar PV is grid-connected where the available roof-top of the school building will be utilized for installation. The annual energy generation from 65 KWp Solar PV is 91.357 MWh (i.e. 0.0913 million units). The same has been estimated based on the data from RET software as shown below:		
IV.	Output Voltage of the Power Plant	220 V AC
V.	Inverter Rating Capacity	400 AH / 6V

System Components	Capacity	Numbers	Indigenous /Imported
Solar PV Module As per IEC61215/IS14286	250 watts	250 nos.	Indigenous
Solar Inverter with Charge Controller As per IEC61683/Equivalent	60VDC, 70kVA Inverter with 220VAC, 2 number of 60A MPPT charge controller	01 nos.	Indigenous
Data Logger with GPRS Remote Monitoring facility for AC & DC Parameter with 2 Yrs Free Servicing	-	01 nos.	Indigenous
Net Metering System		01 nos.	Indigenous

PART-C: Implementation Schedule

1. Major Monitorable Milestone:

a. Finalization of the system size and power load

b. Submission of the Project Report in the prescribed format

c. Sanction form MNRE

d. Selection of supplier

e. Implementation of the Project

f. Oversight of proper functioning of the system

g. Release of payment to the system supplier

2. Project Commissioning Time Line

a.	Submission of Project report to MNRE	-	15 days
b.	Sanction from MNRE	-	45 days
c.	Selection of Supplier	-	45 days
d.	Implementation of Project	-	135 days
	Total	-	240 days

PART-D: Performance Monitoring Mechanism:

Performance Data Monitoring (Daily, Monthly and Annual energy generation ,logging, compilation and sharing with MNRE)	A Data Logger with GPRS Remote Monitoring facility for AC & DC Parameter will be installed
Monthly monitoring of reduction in diesel consumption, if any.	Data card of the diesel consumption will be maintained to ascertain the annual savings.
Own Mechanism	Data card of the diesel consumption will be maintained to ascertain the annual savings.
Third Party	MNRE
Remote Monitoring (for SPV power plants having capacity above 5 kWp)	Data Logger will be used

PART-E: Project cost and Financing Details:

Project Cost:

i. Cost of Systems Hardware	**Rs. 47.89 Lakh**
ii. Cost of transportation and insurance	**Rs. 4.28 Lakh**
iii. Cost of civil works and electrical works	**Rs. 4.28 Lakh**
iv. Cost of installation and commissioning	**Rs. 4.28 Lakh**
v. Cost of Annual Maintenance for 5 years	**Rs. 4.28 Lakh**
vi. Any other related cost	**NA**
Total Cost of Power Plants	**Rs.65 Lakh**
Total kWp SPV Capacity	**65 kWp**
Means of Finance	
a) Contribution of Project Proponent	**Rs.45,50,000 (70% of the project cost)**
b) Contribution of Beneficiaries organization	**NA**
c) Envisaged CFA from MNRE	**Rs 19,50,000 (30% of the project cost)**
d) Other Source (s) of Funding (capital grant)	**NA**
e) Envisaged Soft Loan assistance, if any	**NA**
f) Whether funds are in surplus or deficiency	**Funds are adequate to meet the project cost**
Details of Project revenue recurring , if any	**NA**
Project Duration	**8 Months**

PART-F: Operation & Maintenance Arrangements:

Details of Operation & Maintenance Arrangements

- NDMC will enter into a specific 5 years maintenance contract with the equipment supplier.
- Assistance will also be availed from MNRE or State Nodal Agency engineers from time to time as and when required.
- The electrical engineers of NDMC will also look after the day to day maintenance of the plant.

PART G: Declarations and Certificates

a. It is certified that I/we have read the guidelines issued by the Ministry vide 5/23/2009/P&C dated 16th June, 2010 and the related provisions/terms and conditions for availing financial support from the Ministry of New and Renewable Energy and I agree to abide by these guidelines and related terms and conditions.

b. I understand that failure to comply by these guidelines may result in denial of financial support by the Ministry.

c. I confirm that the present proposal in full or part has not been submitted / has been submitted to any other agency for seeking support (In case proposal has been submitted to any other agency or under consideration all details and a copy of the proposal must be submitted along with the present proposal).

d. I confirm that I will not submit the same proposal or a part thereof to any other funding agency, without prior knowledge of the Ministry of New and Renewable Energy.

e. I confirm that the share of project proponent/beneficiaries shall not be lower than 20% in any circumstances. Projects owned by the Programme Administrators are exempt from this condition.

f. I confirm that the proposed solar PV system(s) have not been installed/supplied at the proposed sites or to the proposed beneficiaries, prior to the receipt of project sanction letter from the Ministry.

g. There is no duplication in the proposal and the submitted proposal is the only proposal by the proponent and to the best of my/ our knowledge no other organization has submitted any proposal for the systems at these site(s) to MNRE for financial support.

h. A detailed site survey has been done/or will be undertaken to identify the beneficiaries before actual supply and installation takes place.

i. This is to certify that the various components of the SPV systems will conform to the Relevant Standards, as mentioned in the Guidelines for grid connected and Decentralized Solar Applications (Annexure-3) for SPV modules and components under JNNSM. Copies of the Relevant IEC/ BIS Certificates should be enclosed.

j. It is mandatory to provide technical performance specifications of each category of system proposed to be supplied under the project and for which the performance will be warranted.

k. All technical parameters and warranty requirements must meet or exceed the requirements mentioned in the guidelines issued by the Ministry.

l. I confirm that in case of any dispute, the decision of Secretary, Ministry of New and Renewable Energy, Government of India will be final and binding on all.

Signature _____

Name & Designation of Authorized Signatory

……

Seal

Place:

Date:

Proposal for

60 kW Roof Top Solar Power Plant at NP Co Ed Primary School, New Delhi.

Submitted by:

New Delhi Municipal Council

Submitted to:

Ministry of New & Renewable Energy

Ministry of New and Renewable Energy
Jawaharlal Nehru National Solar Mission
(Grid Connected Solar Applications)
Project Proposals: Stand Alone SPV Power Plants

1. **Title of the Project : 60kW Roof Top Solar PV plant for NP Co Ed Primary School building**

2. **Name of the Project Proponent : New Delhi Municipal Council (NDMC)**

3. **Socio- Economic Justification of the Project:**

The New Delhi Municipal Council area comprises of the territory that has been described as Lutyen's Delhi and which has historically come to be regarded as the seat of central authority in Union of India. It comprises of important buildings like Rashtrapati Bhawan, Parliament House, Supreme Court, North and South Blocks and buildings abutting Central Vista and also all the diplomatic missions which function as territorial entities under the sovereign jurisdiction of their Flag States. The Government of India is nearly the sole landowner and also owns about eighty percent of the buildings in the New Delhi Municipal Council area. Private ownership of property in this area is marginal. Efficient function of the Municipal services in this area is critical for the internal image of the country and is a factor which has an important bearing on the functioning of the Government apparatus itself. The grid connected solar PV power plant installed in the rooftop of the building will supply the generated power to the grid. The project would not only help savings of precious fossil fuel but will also act as a good demonstration project for the local citizens.

4. **Benefits of the Proposed Project**

- The proposed Grid Connected project of 60 KWp roof top SPV power plants will help in reducing the power demand of the New Delhi City.
- The project will also help in meeting NDMC Solar RPO Obligations.
- The project being situated in the NCR region also act as a focal point of awareness and demonstration project which can be shown to various stakeholders of NDMC area and which can later be replicated.

PART-A: Details of the Project Proponent

i.	Name of the Project Proponent Category of the Project Proponent	**New Delhi Municipal Council (NDMC)** **Deputy Director**
ii.	Name, Designation and Address of the Authorized Representative for Correspondence with telephone no., fax & email	**Add NDMC Contact Name and Address** **Director, NDMC** **Palika Kendra,** **Parliament Street,** **New Delhi-110001**
iii	In case of Channel Partner other than Programme Administrator, the following information will be provided: a) Whether commercial or non-commercial. b) Copy of Articles of Association, Registration No. & Date; PAN/ TAN No. c) Audited Balance Sheet for last three years d) Annual Report of previous year e) Whether MNRE has earlier sanctioned any SPV projects for implementation to the Project Proponent, if yes, please furnish information	**NA**
iv	In case of 1 (e), Please indicate: a) Government Department, Autonomous Institution set up by Central/ State Government, State renewable Energy development agency, Public Sector Undertaking b) Others	**Govt. Body**

PART-B: Details of the Project

1. Summary of the Proposal:

NDMC has taken up the project under the Solar City Scheme of MNRE. The draft Master Plan has already been prepared and the same will be presented before the stakeholder committee.

NDMC now wants to take up certain renewable energy projects on priority basis and as such it is interested in setting up of a 60 kWp grid connected solar photovoltaic system (fixed) on the roof top of the NP Co Ed Primary School Building, New Delhi. The 60 kWp SPV system at roof-top of the building is estimated to afford annual energy generation of 79.891 MWh (i.e. 0.079 million units).

2. Details of the Project Site:

State	:	New Delhi
District	:	New Delhi
City	:	New Delhi
Building	:	NP Co Ed Primary School Building, Netaji Nagar, New Delhi

The School Building has sufficient vacant roof top space available without any obstacle. A pictorial representation of the terraces showing the total available area, area utilized by solar panels and the framework in which the panels may be implemented is detailed in Annexure VI of the DPR enclosed:

It is proposed to utilize a vacant area available of about 850 square meters on these terraces to accommodate a cumulative capacity of 60 kWp of solar PV modules. The total number of 250 watt solar panels to be accommodated on the terraces is shown in detail in Annexure VI of DPR enclosed along with this proposal.

3. Details of Project Beneficiary:

The NDMC area bounded by the junction of Pusa Road and Upper Ridge Road towards east along the New Link Road, the Panchkuian Road upto its junction with the Old Gurgaon Road; thence towards northeast along the Old Gurgaon Road and Chelmsford Road upto the New Delhi Railway Station; thence towards south and south east along the railway line upto its junction with the Hardings Bridge; thence towards south along the Mathura Road; upto its junction with Lodhi Road; thence towards south along the Lodhi Road; upto its junction with the first road leading to Lodhi Colony; thence towards south along the first road leading to Lodhi Colony upto its junction with the Ring Railway; hence towards south along the railway line upto its junction with Qutab Road; thence towards south along the Qutab Road upto to its junction with Kushak Nallaha; thence towards east along the Kaushak Nulla up to its junction with the Boundary of the Corporation and along the south boundary of the Medical Enclave upto its junction with the Ring Road near Gawalior Potteries; thence towards north-west along the Ring Road upto its junction with Kitchner Road, thence towards north along the Upper Ridge up to the starting point.

The Power generated from the proposed power 60 kW power plant will meet electrical loads of lighting and fan and other loads of selected appliances in the building.

4. Details of the Proposed Power Plant:

I.	Proposed capacity of the SPV Power Plant	60 kW
II.	Availability of shadow free land area for the power plant	850 Sq Mtr
III.	Details of loads to be energized by Power Plant, calculations and justification for the proposed capacity and expected annual energy generation	Explained in detail in section 6 of the DPR enclosed
The proposed 60 KWp Solar PV is grid-connected where the available roof-top of the school building will be utilized for installation. The annual energy generation from 60 KWp Solar PV is 79.891 MWh (i.e. 0.079 million units). The same has been estimated based on the data from RET software as shown below:		
IV.	Output Voltage of the Power Plant	220 V AC
V.	Inverter Rating Capacity	400 AH / 6V

System Components	Capacity	Numbers	Indigenous /Imported
Solar PV Module As per IEC61215/IS14286	250 watts	250 nos.	Indigenous
Solar Inverter with Charge Controller As per IEC61683/Equivalent	60VDC, 70kVA Inverter with 220VAC, 2 number of 60A MPPT charge controller	01 nos.	Indigenous
Data Logger with GPRS Remote Monitoring facility for AC & DC Parameter with 2 Yrs Free Servicing	-	01 nos.	Indigenous
Net Metering System		01 nos.	Indigenous

PART-C: Implementation Schedule

1. Major Monitorable Milestone:

a. Finalization of the system size and power load

b. Submission of the Project Report in the prescribed format

c. Sanction form MNRE

d. Selection of supplier

e. Implementation of the Project

f. Oversight of proper functioning of the system

g. Release of payment to the system supplier

2. Project Commissioning Time Line

a.	Submission of Project report to MNRE	-	15 days
b.	Sanction from MNRE	-	45 days
c.	Selection of Supplier	-	45 days
d.	Implementation of Project	-	135 days
	Total	-	240 days

PART-D: Performance Monitoring Mechanism:

Performance Data Monitoring (Daily, Monthly and Annual energy generation ,logging, compilation and sharing with MNRE)	A Data Logger with GPRS Remote Monitoring facility for AC & DC Parameter will be installed
Monthly monitoring of reduction in diesel consumption, if any.	Data card of the diesel consumption will be maintained to ascertain the annual savings.
Own Mechanism	Data card of the diesel consumption will be maintained to ascertain the annual savings.
Third Party	MNRE
Remote Monitoring (for SPV power plants having capacity above 5 kWp)	Data Logger will be used

PART-E: Project cost and Financing Details:

Project Cost:

i. Cost of Systems Hardware	**Rs. 44.21 Lakh**
ii. Cost of transportation and insurance	**Rs. 3.95 Lakh**
iii. Cost of civil works and electrical works	**Rs. 3.95 Lakh**
iv. Cost of installation and commissioning	**Rs. 3.95 Lakh**
v. Cost of Annual Maintenance for 5 years	**Rs. 3.95 Lakh**
vi. Any other related cost	**NA**
Total Cost of Power Plants	**Rs.60 Lakh**
Total kWp SPV Capacity	**60 kWp**
Means of Finance	
a) Contribution of Project Proponent	**Rs.42,00,000 (70% of the project cost)**
b) Contribution of Beneficiaries organization	**NA**
c) Envisaged CFA from MNRE	**Rs 18,00,000 (30% of the project cost)**
d) Other Source (s) of Funding (capital grant)	**NA**
e) Envisaged Soft Loan assistance, if any	**NA**
f) Whether funds are in surplus or deficiency	**Funds are adequate to meet the project cost**
Details of Project revenue recurring , if any	**NA**
Project Duration	**8 Months**

PART-F: Operation & Maintenance Arrangements:

Details of Operation & Maintenance Arrangements

- NDMC will enter into a specific 5 years maintenance contract with the equipment supplier.
- Assistance will also be availed from MNRE or State Nodal Agency engineers from time to time as and when required.
- The electrical engineers of NDMC will also look after the day to day maintenance of the plant.

PART G: Declarations and Certificates

a. It is certified that I/we have read the guidelines issued by the Ministry vide 5/23/2009/P&C dated 16th June, 2010 and the related provisions/terms and conditions for availing financial support from the Ministry of New and Renewable Energy and I agree to abide by these guidelines and related terms and conditions.

b. I understand that failure to comply by these guidelines may result in denial of financial support by the Ministry.

c. I confirm that the present proposal in full or part has not been submitted / has been submitted to any other agency for seeking support (In case proposal has been submitted to any other agency or under consideration all details and a copy of the proposal must be submitted along with the present proposal).

d. I confirm that I will not submit the same proposal or a part thereof to any other funding agency, without prior knowledge of the Ministry of New and Renewable Energy.

e. I confirm that the share of project proponent/beneficiaries shall not be lower than 20% in any circumstances. Projects owned by the Programme Administrators are exempt from this condition.

f. I confirm that the proposed solar PV system(s) have not been installed/supplied at the proposed sites or to the proposed beneficiaries, prior to the receipt of project sanction letter from the Ministry.

g. There is no duplication in the proposal and the submitted proposal is the only proposal by the proponent and to the best of my/ our knowledge no other organization has submitted any proposal for the systems at these site(s) to MNRE for financial support.

h. A detailed site survey has been done/or will be undertaken to identify the beneficiaries before actual supply and installation takes place.

i. This is to certify that the various components of the SPV systems will conform to the Relevant Standards, as mentioned in the Guidelines for grid connected and Decentralized Solar Applications (Annexure-3) for SPV modules and components under JNNSM. Copies of the Relevant IEC/ BIS Certificates should be enclosed.

j. It is mandatory to provide technical performance specifications of each category of system proposed to be supplied under the project and for which the performance will be warranted.

k. All technical parameters and warranty requirements must meet or exceed the requirements mentioned in the guidelines issued by the Ministry.

l. I confirm that in case of any dispute, the decision of Secretary, Ministry of New and Renewable Energy, Government of India will be final and binding on all.

Signature _____

Name & Designation of Authorized Signatory

……

Seal

Place:

Date: