Project design document form
(Version 11.0)

BASIC INFORMATION	
Title of the project activity	5 MW Solar PV Power Plant by AEPL[1]
Scale of the project activity	☐ Large-scale ☒ Small-scale
Version number of the PDD	Version 04
Completion date of the PDD	15/06/2020
Project participants	Fortum Amrit Energy Private Limited EKI Energy Services Limited
Host Party	India
Applied methodologies and standardized baselines	AMS.I.D. "Grid connected renewable electricity generation" Version 18[2]
Sectoral scopes	01 Energy industries (renewable - / non-renewable sources)
Estimated amount of annual average GHG emission reductions	8,597 tCO_2e

[1] https://cdm.unfccc.int/Projects/DB/BVQI1365743425.03/view
[2] https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

Amrit Energy Private Limited (AEPL) has implemented a 5 MW solar photovoltaic technology based power project in Village- Gulabpura in Bhilwara district of Rajasthan. The electricity generated from the project activity is exported to Indian Grid and sold to NTPC Vidyut Vyapar Nigam Limited (NVVN) under a power purchase agreement. AEPL has used thin film Cadmium Telluride (CdTe) solar photovoltaic technology for power generation.

Since the project activity is a Greenfield project, the approved small scale methodology AMS.I.D Version 18 already prescribes the baseline scenario as being "electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid-connected power plants and by the addition of new generation sources". The electricity exported by the project activity displaces an equivalent amount of electricity generated by the power plants already operational and proposed to be added in the Indian Grid which relies predominantly on fossil fuels. Thus, it contributes towards reduction in the demand-supply gap during periods of electricity shortage and increase in the share of renewable energy in the grid mix. The scenario existing prior to the implementation of the project activity is the same as the baseline scenario.

The estimation of GHG emission reductions by the project activity is limited to carbon dioxide (CO_2) only and its primary source is the fossil fuels consumed in the Indian grid. The expected annual net electricity delivered to the grid by the proposed project activity is 9,128 MWh. The estimated annual average and total GHG emission reductions are 8,597 tCO_2e and 60,179 tCO_2e respectively over the chosen during the second crediting period of seven years.

Ministry of Environment, Forest and Climate Change, Govt. of India, has stipulated the following indicators for sustainable development in the guidelines for CDM projects:

Social well being:

- The project leads to generation of business opportunities and employment in the region thereby contributing towards social upliftment through direct and indirect benefits.

- The project activity in its execution lead to development of infrastructure in the region and at the same time promotes business in the region through the improvement in electricity generation capacity of the grid.

Economic well-being:

- The project activity leads to an investment in the region accompanied with business and employment benefits along with improvement of grid supply which otherwise would not have happened in the absence of project activity.

- The clean electricity generated through solar power by the project activity would be fed into the Indian grid thereby improving the availability of electricity in the region. This provides a better scenario for local industries and businesses to improve their production capacities thereby contributing towards the overall economic development of the region.

Environmental well being:

- The project activity employs solar power for generation of electricity thereby displacing fossil fuels which are being rapidly consumed to meet the growing demand of electricity in the country thus contributing towards reduction in GHG emissions.

- Solar power projects generate no end products in their operation in the form of solid waste (ash etc.) compared to alternative modes of power generation (e.g. coal based on which the Indian grid is primarily dependent). Hence, the project activity is a cleaner source of power generation and is encouraging greener practice of power generation.

- The solar power project indirectly is contributing towards conservation of non–renewable resources which are under the constant threat of depletion due to excessive and rapid growth of energy demand. The growing threat of global warming which is a key concern is also addressed due to renewable energy use thereby mitigating climate change.

Technological well being:

- The project activity uses thin film solar PV technology for power generation thereby demonstrating the viability of solar based renewable energy generation in the region, which is fed into the nearest sub-station (part of the Indian Grid), thus, increasing energy availability under the service area of the substation. Hence, the project leads to technological well being.

A.2. Location of project activity

Host Party: India
Region/State/Province: Rajasthan
City/Town/Community: District: Bhilwara, Village: Gulabpura

Physical/ Geographical location:

Latitude: 25^0 51‟ 35.53” North ($25.8599\ ^0$N)
Longitude: 74^0 39‟ 25.56” East ($74.6571\ ^0$E)

The project site is located in Gulabpura village in Bhilwara district of Rajasthan. The nearest railway station is at Vijay Nagar, which is 3 Km from the project location. The nearest airport at Udaipur is 220 Km from the project location. The nearest National Highway NH78 is just 7 Km away from Gulabpura.

A.3. Technologies/measures

The technical specifications of power plant are given below:

- **Solar PV Module:** Solar PV modules of total capacity 5.415 MW (DC)[3] manufactured by First Solar had been selected for the project activity: The details of Modules installed are as follows:

Parameters	Value		
Manufacturer	First Solar[4]		
Cell Type	Thin film Cadmium Telluride (CdTe)		
Model	FS-377	FS-380	FS-382
Modules Wattage	77.5 Wp	80.0 Wp	82.5 Wp
No. of modules	40,558	22,344	5,873
Total number of modules	68,760		

- **Invertors:** 800kVA, 572-820VDC/360V AC capacity invertors made by SMA (Sunny Central -800 CP[5]) had been selected for the project activity.

[3] For purposes of calculation of emission reductions, the grid connected AC capacity of the project activity has been used

[4] http://www.phoenixsolar-group.com/business/us/en/product-catalog/solar-modules/FIRST-SOLAR---FS-377---FS-380---FS-382---FS385.html

- **Power Evacuation:** The direct current from the photo voltaic modules is converted into alternating current by the inverters. This exportable power is stepped up to 33kV by three 2000 KVA, 33KV/415V transformer (manufactured by Kirloskar) which is located in the 33kV plant switchyard and paralleled with the 220/132/33kV substation at Gulabpura Village.

- **Plant Load Factor:** 20.84%[6].

- **Technical Life:** The technical life of the solar PV Power plant is 25 years.

The data to be monitored includes the electricity exported to the grid and electricity imported from the grid, which is measured by Main & Check meters installed at the substation.

The project activity results in displacing the grid power, thus resulting in reduction of CO_2 emissions that would have occurred at fossil fuel fired power plants connected to the Indian grid in the baseline scenario. The baseline scenario for the project activity is "electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid-connected power plants and by the addition of new generation sources". Thus, the project activity provides the same type and levels of service as would have been provided in the baseline scenario.

Solar energy is a pollution-free sustainable form of energy. It does not produce greenhouse gases in its operation, and it does not produce toxic or radioactive waste. Therefore, the technology for the project is environmentally safe and sound. It is procured from world's renowned manufacturers. Further, there is no technology transfer associated with the project activity.

A.4. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host)	Fortum Amrit Energy Private Limited	No
Australia (Other Party)	EKI Energy Services Limited	No

A.5. Public funding of project activity

No public funding was availed for the project activity from parties included in Annex I.

A.6. History of project activity

The project activity was commissioned on 01/02/2012. The registration date of the project activity under CDM mechanism is 12/04/2013. Currently, the project is applying for Renewal of 2nd Crediting Period.

The CDM project activity is neither registered as a CDM project activity nor included as a component project activity (CPA) in a registered CDM programme of activities (PoA). The CDM project activity is also not a project activity that has been deregistered. The CDM project actitivty was not a CPA that has been excluded from a registered CDM PoA.

---

[5] http://www.sma.de/en/products/central-inverters/sunny-central-800cp-xt-850cp-xt-900cpxt.html#Overview-14425

[6] In accordance with para 3 of the EB48 Annex 11, "Guidelines for the reporting and validation of plant load factors", the plant load factor shall be defined ex-ante in the CDM-PDD. The plant load factor for this Project was determined by Lahmeyer International (India) Pvt Limited contracted by the Amrit Energy.

No registered CDM project activity or a CPA under a registered CDM PoA whose crediting period has or has not expired (hereinafter referred to as former project) exists in the same geographical location as the proposed CDM project activity

A.7. Debundling

According to Appendix C of simplified modalities and procedures for small scale CDM project activities, "debundling" is defined as the fragmentation of the large scale project activity into smaller parts. The proposed small scale project activity is not a "debundled" component of large scale project activity. If, there is no registered small scale CDM project activity or a request for registration by another small-scale project activity:

- By the same project participants;
- In the same project category and technology/measure;
- Registered within the previous two years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

AEPL has no registered small scale CDM project activity and has not requested registration for any other small scale project activity in the same project category and technology within 1 km of the proposed small-scale project activity. Thus, 5 MW Solar PV Power plant by AEPL meets the above stated criteria. Hence, the project activity is not a de-bundled component of a larger activity and qualifies as a small scale project activity.

SECTION B. Application of methodologies and standardized baselines

B.1. References to methodologies and standardized baselines

As per the Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories, Type I.D Version 18 has been used.

Title: "Grid connected renewable electricity generation".
Reference: AMS I D, Version 18[7]

It has been referred from the list of approved methodologies for CDM project activities in the UNFCCC/CDM (https://cdm.unfccc.int/methodologies/SSCmethodologies/approved) website.

The approved methodology uses the "Tool to calculate the emission factor for an electricity system"[8] Version 7.0 for determination of the baseline scenario, "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"[9] Version 03.0 for determining project emissions and also draws upon Appendix B of the simplified modalities and procedures for small-scale CDM project activities "Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories" for demonstration of additionality.

B.2. Applicability of methodologies and standardized baselines

The methodology AMS.I.D Version 18 is being applied for the project activity. The reasons for the choice of project type and category for the project activity are as follows:

Criteria	Applicability to the project
1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind,	The project is renewable energy generation through installation of photovoltaic modules. The project will supply electricity to the Indian

[7] https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK
[8] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf
[9] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v3.pdf

geothermal and renewable biomass: (a) supplying electricity to a national or a regional grid; or (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	grid. Thus, this criterion is applicable to the project activity and the project activity complies with this criterion.
2. Illustration of respective situations under which each of the methodology (i.e. AMS-I.D, AMS-I.F and AMS-I.A2) applies is included in Table 2.	As per Table 2 of the AMS.I.D Version 18 (also provided at Appendix-3 of the PDD), project activities that supply electricity to the national/regional grid are applicable under AMS.I.D Version 18. Since the proposed project activity under consideration will also supply electricity to the regional grid. Thus, this criterion is applicable to the project activity and the project activity complies with this criterion.
3. This methodology is applicable to project activities that: (a) Install a Greenfield plant; (b) involve a capacity addition in (an) existing plant(s); (c) involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) involve a replacement of (an) existing plant(s).	The project activity is Greenfield installation of new power plant at a site where there was no renewable energy power plant operating prior to implementation of project. Thus, this criterion is applicable to the project activity and the project activity complies with this criterion.
4. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: (a) The project activity is implemented in an existing reservoir with no change in the volume of reservoir; (b) The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/m^2; (c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m^2.	The project activity is not a hydro power plant. Thus, this criterion is not applicable to the project activity.
5. If new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component. If new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW.	The project does not involve any use of fossil fuel. Thus, this criterion is not applicable to the project activity.

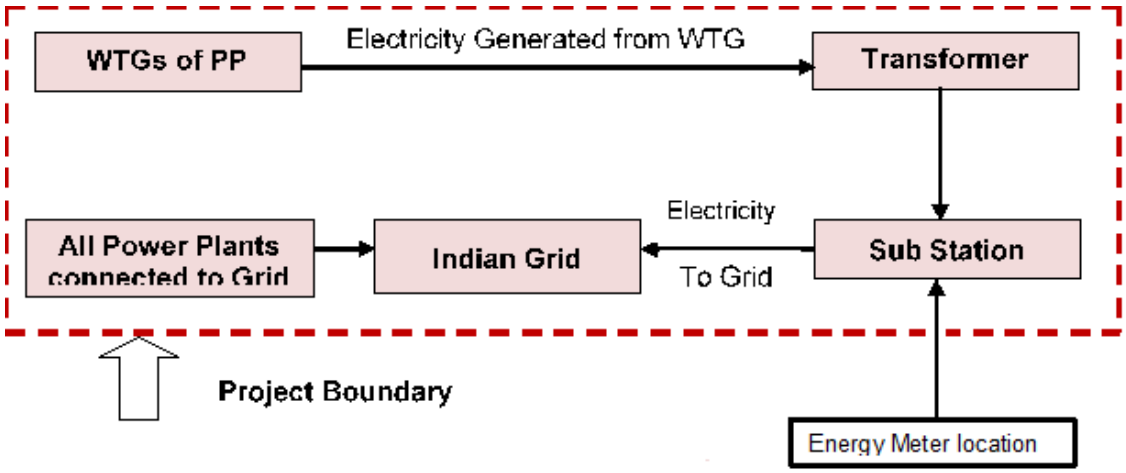
6. Combined heat and power (co-generation) systems are not eligible under this category.	The project activity generates only power and hence is not a cogeneration system. Thus, this criterion is not applicable to the project activity.
7. In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	The project activity is Greenfield and there is no existing power generation facility at the site. Thus, this criterion is not applicable to the project activity.
8. In the case of retrofit or replacement, to qualify as a small scale project, the total output of the modified or retrofitted or replacement unit shall not exceed the limit of 15 MW.	Project activity is neither retrofit nor modification of existing facility. Thus, this criterion is not applicable to the project activity.
9. In the case of landfill gas, waste gas, waste water treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS I.C.: Thermal energy production with or without electricity" shall be explored.	The project activity is a renewable solar Photovoltaic power project and is not a landfill gas, waste gas, wastewater treatment and agro-industries projects or recovered methane emissions project. Hence, the criteria is not applicable to the project activity
10. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.	The Project activity is a renewable solar Photovoltaic power project and is not a biomass project. Hence the criteria is not applicable to the project activity.

Since the project activity is a small scale project activity of 5 MW Solar, the project activity falls under the Sectoral Scope: 01 - Energy industries (renewable/non-renewable sources), Project Type: I - Renewable Energy Projects and Project Category: Grid-connected electricity generation from renewable sources AMS-I.D (Version 18.0).

As per the Power Purchase Agreement signed with NVVN, the project capacity is 5 MW (AC) and the DC capacity of the project is 5.415 MW (DC). Hence, there will be no capacity addition in the future and the capacity of the plant will not exceed the small scale limit of 15 MW over the entire crediting period of the project activity. From the above it is observed that, the project activity is applicable under AMS.I.D.

B.3. Project boundary, sources and greenhouse gases (GHGs)

The project boundary as described in AMS.I.D includes the project power plant and all power plants connected physically to the electricity system. Accordingly the project boundary includes solar PV power generation system and all power plants connected physically to the local grid to which the renewable electricity is supplied to avoid GHG emissions. The project is located in the state of Rajasthan and hence falls under the Indian grid. The following diagram explains the project boundary for the proposed project activity.



Source		GHG	Included?	Justification/Explanation
Baseline	Grid connected electricity generation.	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	No	Minor emission source
Project activity	Greenfield Wind Power Project Activity.	CO_2	No	No CO_2 emissions are emitted from the project
		CH_4	No	Project activity does not emit CH_4
		N_2O	No	Project activity does not emit N_2O
		Other	No	Project activity does not emit other forms of GHG emissions

B.4. Establishment and description of baseline scenario

Updated baseline for the second crediting period in line with the "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period." Version 03.0.1.

This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 283 to 286 of Project Standard version 02.0.

The tool stipulates the following steps to be carried out.

Step 1: Assess the validity of the current baseline for the next crediting period

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

The baseline scenario remains unchanged and is in compliance with all the relevant mandatory national and/or sectoral policies.

Step 1.2: Assess the impact of circumstances

The baseline scenario identified at the validation of the project activity was the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid connected power plants and by the addition of new generation sources into the grid. Thus this project activity was a voluntary investment which intends to replace equivalent amount of electricity at grid from renewable source. PP was not bound to incur this investment; hence absence of project activity (i.e. the investment) does not lead to any continued baseline practice for PP within

their scope whereas the continued operation of the project activity would continue to replace equivalent amount of electricity at grid. Hence, the same baseline as identified in the previous crediting period is still valid for the project. Therefore, the assessment of the changes in market characteristics is not required for the renewal of the project's crediting period under CDM.

Nevertheless, there is an impressive growth attained by the Indian Power Sector within the recent years, the installed capacity has grown from mere 1,713 MW in 1950 to 356,100.20 MW as on 31.03.2018, consisting of 226,279.34 MW Thermal, 77,641.63 MW Renew and 6,780 MW Nuclear. Sector-wise details of installed capacity are shown in Table 1. However, it is evident from Table 1[10] that the installed capacity is predominantly coal based and therefore, is a major source of carbon dioxide emissions in India. Hence, there exists scope for reducing the CO_2 emissions in the country by increased use of renewable energy sources.

Furthermore, project participant has considered the latest available CO_2 Baseline Database (CEA database, version 15) at the time of requesting renewal of the crediting period for establishing the baseline emission factor, which itself considered all the new circumstances. Hence, the new circumstances do not have an impact on the baseline emission. As per below table, the fossil fuel based thermal power generation is dominant over the renewable based power generation, thus baseline scenario remains same as original.

Table 1: Sector- wise installed capacity (MW) as on 31/03/2019 (CEA Database version 15)

Sector	Thermal				Nuclear	Hydro	RES	Total
	Coal	Gas	Diesel	Total				
State	65366.50	7118.71	363.93	72849.14	0.00	29878.80	2347.93	105075.86
Central	58820.00	7237.91	0.00	66057.91	6780.00	12126.42	1632.30	86596.63
Private	76518.00	10580.60	273.70	87372.30	0.00	3394.00	73661.40	164427.70
All India	200704.50	24937.22	637.63	226279.34	6780.00	45399.22	77641.63	356100.19

Thus, current baseline remain same and there is no impact if circumstances, existing at the time of requesting renewal of crediting period.

Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested

As explained in step 1.2, the baseline scenario was the electricity import/generation from the power plants connected to the electricity grid. The project activity in green field project and there is no any baseline equipment or investment involved in project activity. Therefore this condition is not applicable to the project activity.

Step 1.4: Assessment of the validity of the data and parameters

This step stipulates that “Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity.”

In the context of the present project activity the emission factor has been updated along with the approach used to calculate the emission factor.

[10] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf

Step 2: Update the current baseline and the data and parameters

As evident from the explanation provided above the baseline scenario remains unchanged. Only the approach used to calculate the baseline emission factor is updated as per the latest version of CEA database available at the time of PDD submission for renewal.

In line with the project standard version 02.0, the impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant EB guidance with regard to renewal of the crediting period at the time of requesting renewal of crediting period; and the correctness of the application of an approved baseline methodology for the determination of the continued validity of the baseline or its update, and the estimation of emission reductions for the applicable crediting period

Impact of the national and/or sectoral policies and circumstances upon the baseline scenario of the project activity

The Government of India enacted the Electricity Act in the year 2003 to harmonize and rationalize the provisions in the existing laws. The Act consolidated the laws relating to generation, transmission, distribution, trading and use of electricity. With the Enactment of the act, the then existing laws viz, The Indian Electricity Act 1910, The Electricity Supply Act, 1948 and The Electricity Regulatory Commissions Act, 1998 were repealed. The Electricity Act 2003 was in force at the time of the completion of the baseline study for the registered PDD.

Section 3 of the said act required the Central Government to prepare the national electricity policy and tariff policy, in consultation with the State Governments and the Authority for development of the power system based on optimal utilization of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy. In accordance with the section 3 of the Electricity Act 2003, the Central Government notified the National Electricity Policy[11] on 12th February 2005 which was in force at the time of completion of the baseline study as stated in the registered PDD of the project activity. This policy has not been revised since then and is currently in force as well.

In addition to the above policies, State Electricity Regulatory Commissions (SERCs) have announced preferential tariffs and Indian Renewable Energy Development Agency (IREDA) provides term loan assistance towards establishing biomass power projects. All these fiscal and financial incentives were in force at the time of completion of the baseline study for the registered PDD of the project activity and still continue to exist.

The state electricity regulatory commission issues tariff order in respect of procurement of power generated wind generators and there is no mandatory national and/or sectoral policies have come into effect that would affect the compliance of the current baseline. Hence, it can be concluded the current baseline complies with all relevant mandatory national and/or sectoral policies that have come into effect after the submission of the project activity for validation and are applicable at the time of requesting renewal of the crediting period.

However, in spite of the financial incentives given by the government to renewable power projects in India the generation from the low cost must run resources connected to the Southern Grid has not increased to such an extent that this would lead to more than 50% contribution from the low cost must run resources towards the total generation from the Southern Grid.

The approved small scale methodology for Grid connected renewable electricity generation, AMS-I.D (Version 18), has been used to determine the baseline and the estimation of emission reductions for the applicable crediting period. As referred in the methodology "*Tool to calculate the*

[11] http://www.cercind.gov.in/Act-with-amendment.pdf

emission factor for an electricity system" *(version 07.0)* has been used to determine continued validity of the baseline based on combined margin (CM) calculations.

As per CEA database version 15, the fossil fuel dominated electricity is more than renewable sector and is continuing with same pattern. In light of the above discussion it is to be concluded that in accordance with relevant guidelines stipulated in the Project Standard version 02.0, national and/or sectoral policies and circumstances had been considered towards formulating the OM & BM baseline scenario. Hence the baseline scenario as applied for the present project activity remains justified.

As per the approved small scale methodology for Grid connected renewable electricity generation, AMS-I.D (Version 18.0) para 19: "If the project activity is the installation of a Greenfield power plant, the baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

The project activity involves setting up of solar project to produce electricity and supply to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants.

In the absence of the project activity, the equivalent amount of power would have been drawn from the Indian grid. Hence, the baseline for the project activity is the equivalent amount of power from the Indian grid.

The combined margin ($EF_{grid,CM,y}$) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) and build margin (BM). Calculations for this combined margin must be based on data from an official source (where available) and made publically available. The CEA database version 15 is the latest available data at the time of PD submission to DOE for validation, hence same is considered for emission factor calculations.

The combined margin of the Indian grid used for the project activity is as follows:

Parameter	Value	Nomenclature	Source
$EF_{grid,CM,y}$	0.9419 tCO_2/MWh	Combined margin CO_2 emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Baseline CO_2 Emission Database, Version 15.0, Dec 2019 published by Central Electricity Authority (CEA), Government of India
$EF_{grid,OM,y}$	0.9622 tCO_2/MWh	Operating margin CO_2 emission factor for the project electricity system in year y	Calculated as the last 3 year (2016-17, 2017-18, 2018-19) generation-weighted average, sourced from Baseline CO_2 Emission Database, Version 15.0, Dec 2019 published by Central Electricity Authority (CEA), Government of India
$EF_{grid,BM,y}$	0.8811 tCO_2/MWh	Build margin CO_2 emission factor for the project electricity system in year y	Baseline CO_2 Emission Database, Version 15.0, May 2019 published by Central Electricity Authority (CEA), Government of India

B.5. Demonstration of additionality

Existing National and/or Sectoral Policies

Annexure 3 of the EB 22 states that national and/or sectoral policies and circumstances have to be accounted for when considering the baseline. Para 7(a) states that, only those national and/or sectoral policies or regulations under paragraph 6(a) i.e. type E+ policy that increase GHG emissions, that have been implemented before adoption of the Kyoto Protocol by the COP (decision 1/CP.3, 11 December 1997), shall be taken into account when developing a baseline scenario. The Electricity Act of 2003 promoted cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity (Refer Section 86(1) of Electricity Act 2003). Therefore, it could be seen that the provincial and sectoral policies are E- i.e., policies that decrease GHG emissions which is after November 2001.Hence the baseline scenario is the electricity generation by grid connected fossil fuel dominated power plants confirming to Annex 3 of EB 22.

Further, the baseline alternative mentioned above is in compliance with all the applicable regulatory policies and laws. Additionally, the project proponent is under no compulsion to opt for any particular technology or even a renewable mode of power generation. There is no governmental body or EB policy which requires a particular kind of fuel to be chosen and there is no legal requirement to which the above alternative does not conform.

Description on Prior CDM consideration

"Guidance on the demonstration and assessment of prior consideration of the CDM" (EB62, Annex 13), states that for project activities with a starting date on or after 02 August 2008, the project participant must inform a Host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status within six months of the project activity start date.

In line with the above guidance, Amrit Energy Private Limited intimated the UNFCCC of its intention to seek CDM for the proposed project activity vide its email dated 21st April 2011. Further on change in location of the project, Amrit Energy Private Limited again sent a prior consideration of CDM form on 16th June 2011 to the UNFCCC and on 15th November 2011 to DNA of India, which is within six months of the start date of the project activity i.e. 30th August, 2011 (as mentioned in section C.1.1). Hence, it can be clearly established that, CDM was seriously considered in the decision to proceed with the proposed project activity.

Justification of Additionality:

The project activity meets the eligibility criteria to use simplified modalities and procedure for small scale CDM project activities as set out in paragraph 6 (C) of decision 17/CP.7. As per the decision 17/CP.7 Para 43, a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity. Further as per the "Guidelines on the demonstration of additionality of small-scale project activities" Version 09, a proposed small scale CDM project activity will be considered as additional if the project activity would not have occurred any way due to at least one of following barriers[12]:

a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;
b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;

[12] https://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid05.pdf

c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;
d) Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

It goes on to provide a positive list of grid-connected renewable electricity generation technologies that are automatically defined as additional, without further documentation of barriers. The list consists of the following grid-connected renewable electricity generation technologies of installed capacity up to 15 MW:

a) Solar technologies (photovoltaic and solar thermal electricity generation);
b) Off-shore wind technologies;
c) Marine technologies (wave, tidal);
d) Building-integrated wind turbines or household rooftop wind turbines of a size up to 100 kW

Since the proposed project activity is a 5 MW capacity grid connected solar photovoltaic technology based electricity generation project, Hence, as per Para 2 (a), Annex 27, EB 68, project is listed under positive list of grid-connected renewable electricity generation technologies that are automatically defined as additional, without further documentation of barriers. Hence, it can be concluded that the project is additional.

B.6. Estimation of emission reductions

B.6.1. Explanation of methodological choices

As per the approved consolidated Methodology AMS - I.D, version 18:

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid- connected power plants. The baseline emissions are to be calculated as follows:

$$\mathbf{BE_y = EG_{BL,y} \times EF_{grid,CM,y}}$$

Where:

BE_y = Baseline emissions in year y (t CO_2/yr)

$EG_{BL,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO_2/MWh)

As per methodology, combined grid emission factor as per the "Tool to calculate the emission factor for an electricity system" version 07 is calculated as below.

CO_2 Baseline Database for the Indian Power Sector, Version 15, December 2019[13] published by Central Electricity Authority (CEA), Government of India has been used for the calculation of emission reduction.

[13] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf

As per Methodological tool: Tool to calculate the emission factor for an electricity system (Version 07.0, EB 100, Annex 4), following six steps have been followed:

(a) **Step 1:** Identify the relevant electricity systems;

(b) **Step 2:** Choose whether to include off-grid power plants in the project electricity system (optional);

(c) **Step 3:** Select a method to determine the operating margin (OM);

(d) **Step 4:** Calculate the operating margin emission factor according to the selected method;

(e) **Step 5:** Calculate the build margin (BM) emission factor;

(f) **Step 6:** Calculate the combined margin (CM) emission factor.

Step 1: Identify the relevant electricity systems

As described in tool "For determining the electricity emission factors, identify the relevant project electricity system. Similarly, identify any connected electricity systems". It also states that "If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used". Keeping this into consideration, the Central Electricity Authority (CEA), Government of India has divided the Indian Power Sector into five regional grids viz. Northern, Eastern, Western, North-eastern and Southern.

However since August 2006, however, all regional grids except the Southern Grid had been integrated and were operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids were treated as a single grid named as NEWNE grid from FY 2007-08 onwards for the purpose of this CO_2 Baseline Database. As of 31 December 2013, the Southern grid has also been synchronised with the NEWNE grid, hence forming one unified Indian Grid. Since the project supplies electricity to the Indian grid, emissions generated due to the electricity generated by the Indian grid as per CM calculations will serve as the baseline for this project.

Table: Geographical Scope of Indian Electricity Grid

Northern	Eastern	Western	North-Eastern	Southern
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Andhra Pradesh
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Kerala
Himachal Pradesh	West Bengal	Dadar& Nagar Haveli	Meghalaya	Tamil Nadu
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Telangana
Punjab	Andaman & Nicobar	Maharashtra	Nagaland	Puducherry
Rajasthan		Goa	Tripura	Lakshadweep
Uttar Pradesh				
Uttarakhand				

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.
Option II: Both grid power plants and off-grid power plants are included in the calculation.
The Project Participant has chosen only grid power plants in the calculation.

Step 3: Select a method to determine the operating margin (OM)

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods, which are described under Step 4:

(a) Simple OM; or
(b) Simple adjusted OM; or
(c) Dispatch data analysis OM; or
(d) Average OM.

The data required to calculate Simple adjusted OM and Dispatch data analysis OM is not possible due to lack of availability of data to project developers. The choice of other two options for calculating operating margin emission factor depends on generation of electricity from low-cost/ must-run sources. In the context of the methodology low cost/must run resources typically include hydro, geothermal, wind, low cost biomass, nuclear and solar generation.

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)

	2014-15	2015-16	2016-17	2017-18	2018-19
India	16.8%	15.1%	14.6%	14.3%	14.5%

Data Source: Central Electricity Authority (CEA) database Version 15, Dec 2019[14]

The above data clearly shows that the percentage of total grid generation by low-cost/ must-run plants (on the basis of average of five most recent years) for the Indian grid is less than 50 % of the total generation. Thus the Average OM method cannot be applied, as low cost/must run resources constitute less than 50% of total grid generation.

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages:

(a) **Ex-ante option:** if the ex-ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required.

OR

(b) **Ex-post option:** if the ex-post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

[14] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf

PP has chosen ex-ante option for calculation of Simple OM emission factor using a 3-year generation-weighted average, based on the most recent data available at the time of submission of the PD to the DOE for validation.

OM determined at validation stage will be the same throughout the crediting period. There will be no requirement to monitor & recalculate the emission factor during the crediting period.

Step 4: Calculate the operating margin emission factor ($EF_{grid,OMSimple,y}$) according to the selected method

The operating margin emission factor has been calculated using a 3 year data vintage:

Net Generation in Operating Margin (GWh) (incl. Imports)			
	2016-17	**2017-18**	**2018-19**
INDIAN Grid	916,278	960,639	995,957

Simple Operating Margin (tCO_2/MWh) (incl. Imports)			
	2016-17	**2017-18**	**2018-19**
INDIAN Grid	0.9636	0.9543	0.9685

Weighted Generation Operating Margin	
INDIAN Grid	**0.9622**

Step 5: Calculate the build margin (BM) emission factor ($EF_{grid,BM,y}$)

As per Methodological tool: "Tool to calculate the emission factor for an electricity system" (Version 07.0, EB 100, Annex 4) para 72:

In terms of vintage of data, project participants can choose between one of the following two options:

(a) **Option 1 -** for the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of PD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

(b) **Option 2 -** For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex ante, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

Option 1 as described above is chosen by PP to calculate the build margin emission factor for the project activity. BM is calculated ex-ante based on the most recent information available at the time of submission of PD and is fixed for the entire crediting period.

Build Margin (tCO_2/MWh) (not adjusted for imports)	
	2018-19
INDIAN Grid	**0.8811**

Step 6: Calculate the combined margin (CM) emission factor ($EF_{grid,CM,y}$)

As per Methodological tool: "Tool to calculate the emission factor for an electricity system" (Version 07.0, EB 100, Annex 4) para 81:

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) is based on one of the following methods:

(a) Weighted average CM; or
(b) Simplified CM.

PP has chosen option (a) i.e weighted average CM to calculate the combined margin emission factor for the project activity.

The combined margin emissions factor is calculated as follows:

$$\mathbf{EF_{grid,CM,y} = EF_{grid,OM,y}* W_{OM} + EF_{grid,BM,y}* W_{BM}}$$

Where:

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year y (t CO_2/MWh)
$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year y (t CO_2/MWh)
W_{OM} = Weighting of operating margin emissions factor (per cent)
W_{BM} = Weighting of build margin emissions factor (per cent)

The following default values should be used for W_{OM} and W_{BM}:

For solar project activities: W_{OM} = 0.75 and W_{BM} = 0.25 (owing to their intermittent and non-dispatchable nature) for the second crediting period and for subsequent crediting periods. Since project activity is of power generation by using solar, the above weightage has been considered for OM and BM.

Therefore, $EF_{grid,CM,y}$ = 0.9622 * 0.75 + 0.8811 * 0.25
= 0.9419 tCO_2/MWh

Baseline emission factor (EF_y):

The baseline emission factor is calculated using the combined margin approach as described in Step 6 above:

Therefore, $EF_y = EF_{grid,CM,y}$ = 0.9419 tCO_2/MWh.

BE_y= 9,128 x 0.9419 = 8,597 tCO_2 during a given year y.

B.6.2. Data and parameters fixed ex ante

Data/Parameter	$EF_{grid,OM,y}$
Data unit	tCO_2/MWh
Description	Operating Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 15, Dec 2019[15]
Value(s) applied	0.9622
Choice of data or measurement methods and procedures	Calculated as the last 3 year (2016-17, 2017-18, 2018-19) generation-weighted average, sourced from Baseline CO_2 Emission Database, Version 15.0, Dec 2019 published by Central Electricity Authority (CEA), Government of India.
Purpose of data	For the calculation of the Baseline Emission
Additional comment	This parameter is fixed ex-ante for the entire crediting period

Data/Parameter	$EF_{grid,BM,y}$
Data unit	tCO_2/MWh
Description	Build Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 15, Dec 2019[16]
Value(s) applied	0.8811
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 07" as per the latest data available for the most recent year 2018-19. The data is obtained from "CO_2 Baseline Database for Indian Power Sector" version 15, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	For the calculation of the Baseline Emission
Additional comment	This parameter is fixed ex-ante for the entire crediting period

[15] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf
[16] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf

Data/Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 15, Dec 2019[17]
Value(s) applied	0.9419
Choice of data or measurement methods and procedures	The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$ Where: $EF_{grid,BM,y}$= Build margin CO_2 emission factor in year *y* (tCO_2/MWh) $EF_{grid,OM,y}$= Operating margin CO_2 emission factor in year *y* (tCO_2/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 75% W_{BM}= Weighting of build margin emissions factor (%) = 25%
Purpose of data	For the calculation of the Baseline Emission
Additional comment	This parameter is fixed ex-ante for the entire crediting period

B.6.3. Ex ante calculation of emission reductions

Parameter	Value	Units	Source
Installed Capacity (AC)	5	MW	Detailed Project Report prepared by Lahmeyer International (India) Pvt. Ltd.
No. of days of operation	365	Days	
No of Hours	24	Hours	
Capacity Utilization Factor	20.84	%	
Net Generation	9,128	MWh	

Particulars	Unit	2016-17	2017-18	2018-19
Simple Operating Margin (incl. Imports)	tCO_2e/MWh	0.9636	0.9543	0.9685
Net Generation in Operating margin	GWh	916,278	960,693	995,957
Weighted Generation Operating Margin	tCO_2e/MWh	0.9622		

Particulars	Unit	Value	Weight
Weighted Generation Operating Margin	tCO_2e/MWh	0.9622	0.75
Build Margin (not adjusted for imports)	tCO_2e/MWh	0.8811	0.25
Combined Margin Emission Factor	tCO_2e/MWh	0.9419	

Baseline Emissions BE_y (As per Equation (1) of AMS.I.D, Version 18),

$$BE_y = EG_{BL,y} \times EF_{CO2,grid,y}$$

Where,

[17] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf

$EG_{BL,y}$ = 9,128 MWh
$EF_{CO2,grid,y}$ = $EF_{grid,CM,y}$ = 0.9419 tCO_2e/MWh

Hence,

BE_y = 9,128 MWh * 0.9419 tCO_2e/MWh
= 8,597 tCO_2e

Project Emissions, PE_y = 0 (As per para 39 of AMS-I.D, Version 18.0)

Leakage Emissions, LE_y = 0 (As per para 42 of AMS-I.D, Version 18.0)

Therefore the emission reductions, ER_y (As per Equation (9) of AMS.I.D, Version 18.0)

$ER_y = BE_y – PE_y - LE_y$

= 8,597 – 0 – 0
= 8,597 tCO_2e

B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
Year 1	8,597	0	0	8,597
Year 2	8,597	0	0	8,597
Year 3	8,597	0	0	8,597
Year 4	8,597	0	0	8,597
Year 5	8,597	0	0	8,597
Year 6	8,597	0	0	8,597
Year 7	8,597	0	0	8,597
Total	60,179	0	0	60,179
Total number of crediting years	7			
Annual average over the crediting period	8,597	**0**	**0**	8,597

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data/Parameter	$EG_{BL,y}$
Data unit	MWh/yr
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data	Monthly Generation Record / Joint Meter Reading sheets
Value(s) applied	9,128
Measurement methods and procedures	Main and check electronic energy meters are installed at the grid interconnection point to continuously measure the net electricity supplied to the grid. The meters are calibrated and sealed by the grid utility and conform to the Central Electricity Authority (Installation & Operation Meters) Regulations, 2006. Meter reading are taken jointly by grid utility and power producer on monthly basis. The Monthly Generation Records/Joint Meter Readings will be archived electronically by AEPL.
Monitoring frequency	Continuously

QA/QC procedures	Calibration of all the meters are done once in three years[18]. The meters are bi-directional with accuracy class 0.2 s. The main meter reading is cross checked with records for sold electricity (invoices).
Purpose of data	Calculation of baseline emissions
Additional comment	The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

B.7.2. Sampling plan

No sampling approach has been used

B.7.3. Other elements of monitoring plan

The monitoring plan has been devised as per approved small scale methodology AMS.I.D Version 18.

Monitoring data:

The parameters monitored ex-post is the net electricity supplied to the grid ($EG_{BL,y}$) in the year y.

Measurement Method: The parameter $EG_{BL,y}$ is measured by a main meter installed at 220/132/33kV substation at Gulabpura Village. The Check meter is installed at the substation in case the main meter fails to work. The on-grid electricity is monitored continuously and recorded on a monthly basis. The meters are bi-directional with an accuracy class of 0.2 s. The measurement results are cross-checked with records for sold electricity from the invoices. All data collected as part of the monitoring are archived electronically and kept at least for 2 years after the end of the last crediting period. All meters are calibrated once every three years which is conservative when compared to the Central Electricity Authority (Installation & Operation Meters) Regulations, 2006 that requires calibration of meters once every five years.

Monitoring organization: AEPL has set up a special CDM group to take charge of data collection, supervision, verification and archiving. The structure of the monitoring group is as follows:

Designation	Responsibilities	Reporting
CDM Manager	• Preparation of Monthly electricity generation report and calculation of emission reduction. • Preparation of Monthly and annual CDM Monitoring report • Overseas the collection, recording and storage of data.	Reports to the Vice President (O&M)
Site Engineer	• Responsible for the completeness and reliability of the data. • Responsible for carrying out meter calibration. • Generates quarterly metered net electricity generation data	Reports to the CDM Manager
Site Supervisor	Responsible for monitoring hourly measurements and ensuring that meters are functioning correctly.	Reports to the Site Engineer

Quality Assurance and Quality Control: The project activity uses high-precision monitoring meters to monitor the electricity to the grid. The meters are calibrated and sealed as per the industry practices by the grid utility. Hence, high quality is ensured. Electricity sales receipts are used to test the consistency of the recorded data.

[18] This is conservative when compared to the Central Electricity Authority (Installation & Operation Meters) Regulations, 2006 that require calibration of meters once every five years.

Emergency Preparedness and Uncertainty Procedure: In case Main meter or Check meter is found to be outside the acceptable limits of accuracy or faulty or not functioning properly, it is repaired, recalibrated or replaced as soon as possible. In the event that the Main meter is not in service as a result of maintenance, repairs or testing, the Check meter are used for readings.

In case both the main and check meter are found to be outside the acceptable limits of accuracy or faulty or not functioning properly, both the meters shall be calibrated immediately and the error percentage found in the main mater during its calibration shall be applied to its metered energy data for the entire period since its last calibration to obtain the corrected value of net electricity exported to the grid.

In case the dates of a particular monitoring period do not match with the dates of the billing cycle, the net electricity exported to the grid is calculated from:

- Data collected by AEPL from energy meters installed at the plant end and recorded daily in the plant log books
- Apportioning the net electricity exported to grid, as recorded in the Monthly Generation Record/Joint Meter Reading statement, based on the number of days in the monitoring period and the number of days for which Monthly Generation Record/Joint Meter Reading report was taken.

The conservative value among the two is used for calculation of emission reductions during that period.

Personnel training: The training for operating and maintaining the plant is provided by the technology supplier. All persons that form part of this CDM Project Team receive appropriate CDM training. The training provides an overview of the CDM and covers all elements of the monitoring plan in detail.

SECTION C. Start date, crediting period type and duration

C.1. Start date of project activity

30/08/2011

According to Paragraph 67 of the Report on 41st meeting of the Executive Board of the Clean Development Mechanism, “the start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity. This, for example, can be the date on which contracts have been signed for equipment or construction/operation services required for the project activity.” In line with the above guideline, the start date of the project activity has been considered as the date when the contracts for offshore supply, onshore supply, civil works and onshore services for the project activity were all signed on the same day i.e. 30/08/2011.

C.2. Expected operational lifetime of project activity

25 years and 0 months

C.3. Crediting period of project activity

C.3.1. Type of crediting period

Renewable crediting period has been used and currently the project is requesting the renewal of 2nd crediting period.

C.3.2. Start date of crediting period

The project is applying for renewal of 2nd crediting period. The start date of the new crediting period will be from 12/04/2020.

C.3.3. Duration of crediting period

7 years and 0 months

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

Not applicable. The Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India notification[19] S.O. 1533 (E) dated September 14, 2006 and its amendment notification S.O.-3067(E) dated 1/12/2009[20], regarding the requirement of Environment Impact Assessment (EIA) studies as per the Environment Protection Rule, 1986 (Published in the Gazette of India, Extraordinary, Part-II, and Section 3, Sub-section (ii) Ministry of Environment Forest and Climate Change) states that any project developer in India needs to file an application to the Ministry of Environment, Forest and Climate Change (including a public hearing and an EIA) in case the proposed industry or project is listed in a predefined list. Solar PV power projects are not included in this list and thus an EIA is not required. Ministry of Environment, Forest and Climate Change vide their OM J-11013/41/2006 –IA II(I) dated 13th May 2011 has reaffirmed this and exempted the Solar PV power plants from EIA and EC requirement.

D.2. Environmental impact assessment

Not applicable. The project activity does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment, Forest and Climate Change, Government of India. Hence, EIA is not required to be undertaken by the host party for the proposed project activity.

SECTION E. Local stakeholder consultation

E.1. Modalities for local stakeholder consultation

Amrit Energy Private Limited invited stakeholders to a meeting to explain the UNFCCC CDM process and proposed 5 MW Solar PV Power Project. Stakeholders were invited for the meeting through personal invitation letters dated 24th January, 2012 and thus, ten days of time was provided to the stakeholders before the stakeholder consultation meeting. Stakeholders‟ meeting for the CDM project on the 5 MW Solar Photovoltaic Power Plant of AEPL took place on 3 rd February, 2012 at the project site (Gulabpura village in Hurda Tehsil of Bhulwara district, Rajasthan). Approximately 28 villagers from nearby villages Gulabpura, Vijaynagar, Badla and Rupaheli attended this meeting.

A record of the people attending the meeting was maintained and all comments from the stakeholders received during the meeting were recorded and compiled in the minutes of meeting.

E.2. Summary of comments received

The meeting was presided over by Mr. Vivek Rai (General Manager, AEPL), who welcomed the gathering and introduced the company and its initiative to those present. He gave a brief description about initiative by Amrit Energy Private Limited in the solar power generation sector. He explained to the stakeholders about how the project will be beneficial for the people in the surrounding areas. He invited Mr. S.S. Parmar (O&M Consultant) to describe the technical aspects

19 http://envfor.nic.in/legis/eia/so1533.pdf
20 http://moef.nic.in/downloads/rules-and-regulations/3067.pdf

of the project activity. He informed the stakeholders present at the meeting about the capacity of the solar PV power project and the technology proposed to be employed for the power generation. He further pointed out the benefits of renewable energy power generation as compared to the conventional sources of power based on fossil fuels such as coal and oil. CDM consultant present at the meeting briefed the stakeholders on the possible threat of climate change caused due to increased concentration of Greenhouse gases in the atmosphere. He further briefed the gathering about Kyoto Protocol, Clean Development Mechanism and its associated benefits. He described the project activity in relation to CDM and discussed the benefits of implementing the project. He described that the project, if implemented, would result in reduction of Greenhouse gases in the atmosphere by feeding power to the fossil fuel fired grid system. Thus, he explained that the project activity would be beneficial to the environment and the society as a whole.

Mr. Rai then invited the stakeholders to share their queries, suggestions and concerns with respect to the proposed CDM project activity and replied to the same. Following questions were raised by the stakeholders:

Sl. No.	Question	Stakeholder	Answer
1.	Will the operation of the plant result in increased temperature in the surroundings?	Radheshyam Jangid (Village: Gulabpura)	Since the electricity generation is dependent upon the sun rays falling on the PV modules, there will be no generation during night time and the generation will be less during cloudy days.
2.	How much electricity will be generated from this solar PV power plant?	Md. Iliyas (Village: Vijaynagar)	The operation of the power plant will result in approx. 9,128 MWh of electricity. In simple terms, it could light up 10400 electric bulbs of 100W capacity for the whole year long.

The participants expressed their positive feedback on the initiative taken up by the project promoter. They also expressed their goodwill for the environment friendly initiative.

Finally, Mr. Rai thanked all the participants for attending this meeting on invitation from Amrit Energy Private Limited. He also expressed that AEPL is committed to its social and environmental obligations and invites various participants to keep on giving their feedback on a continuous basis so that if any improvements are called for, those could be implemented in various operations of the project.

E.3. Consideration of comments received

All the stakeholders were appreciative that the CDM project activity in their locality is contributing to a global cause and they commended the AEPL management for their initiatives in the area of solar power development. The participants had raised various questions mostly related to the benefits of the project for the nearby villagers and any harmful effects from commissioning of the plant. All the questions were satisfactorily explained to the participants by the project promoter. The project promoter explained about the technical details, feasibility of the project activity and its impacts on environment. The stakeholders appreciated the project promoter for the environmental friendly measures. Considering the comments made by the stakeholders, no significant negative impacts due to the project activity had been identified.

SECTION F. Approval and authorization

The Party involved in the project activity is India and it is involved indirectly. The Letter of Approval from the Designated National Authority for India i.e. National CDM Authority is being provided.

Appendix 1. Contact information of project participants

Organization name	Amrit Energy Private Limited
Country	India
Address	90 Pirphukur Road, Bansdroni, Kolkata, West Bengal-700070
Telephone	+91-33-40106400
Fax	+91-33-23572804
E-mail	amrit.nvvn@yahoo.com
Website	-
Contact person	Mr. Vivek Rai, General Manager

Appendix 2. Affirmation regarding public funding

Not Applicable.

Appendix 3. Applicability of methodologies and standardized baselines

Please refer section B.2 of the PDD.

Appendix 4. Further background information on ex ante calculation of emission reductions

Please refer section B.6.3 of the PDD.

Appendix 5. Further background information on monitoring plan

Please refer to section B.7 of the PDD.

Appendix 6. Summary report of comments received from local stakeholders

Please refer section E of the PDD.

Appendix 7. Summary of post-registration changes

Not Applicable.

- - - - -

Document information

Version	*Date*	*Description*
11.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Make editorial improvements.
10.1	28 June 2017	Revision to make editorial improvement.
10.0	7 June 2017	Revision to: • Improve consistency with the "CDM project standard for project activities" and with the PoA-DD and CPA-DD forms; • Make editorial improvement.
09.0	24 May 2017	Revision to: • Ensure consistency with the "CDM project standard for project activities" (CDM-EB93-A04-STAN) (version 01.0); • Incorporate the "Project design document form for small-scale CDM project activities" (CDM-SSC-PDD-FORM); • Make editorial improvement.
08.0	22 July 2016	EB 90, Annex 1 Revision to include provisions related to automatically additional project activities.
07.0	15 April 2016	Revision to ensure consistency with the "Standard: Applicability of sectoral scopes" (CDM-EB88-A04-STAN) (version 01.0).
06.0	9 March 2015	Revision to: • Include provisions related to statement on erroneous inclusion of a CPA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Make editorial improvement.
05.0	25 June 2014	Revision to: • Include the Attachment: Instructions for filling out the project design document form for CDM project activities (these instructions supersede the "Guidelines for completing the project design document form" (Version 01.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and Appendix 1; • Change the reference number from F-CDM-PDD to CDM-PDD-FORM; • Make editorial improvement.
04.1	11 April 2012	Editorial revision to change version 02 line in history box from Annex 06 to Annex 06b.

Version	*Date*	*Description*
04.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the project design document form for CDM project activities" (EB 66, Annex 8).
03.0	26 July 2006	EB 25, Annex 15
02.0	14 June 2004	EB 14, Annex 06b
01.0	03 August 2002	EB 05, Paragraph 12 Initial adoption.

Decision Class: Regulatory
Document Type: Form
Business Function: Registration
Keywords: project activities, project design document