



**VALIDATION OPINION/
Notification of Changes (part 1 of 2)
and Revision of Monitoring Plan
(part 2 of 2)
as observed during verification of the
CDM Project Activity**

**5 MW Sahu Hydro Electric Project for a
grid connected system in Himachal
Pradesh, India**

(UNFCCC Reference Number: 1753)

in
INDIA

Report No. 01 997 9105059994-1

Version 02, 2011-05-23

TÜV Rheinland Japan Ltd.

I. Project data:

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| Project title: | 5 MW Sahu Hydro Electric Project for a grid connected system in Himachal Pradesh, India |
| Registration date: | 24/06/2009 |
| UNFCCC Reference No. | 1753 |
| Methodology: | AMS I.D, version 13 |
| GHG reducing measure/technology: | Supply of renewable electricity (to local grid interconnected with fossil fuel dominated regional grid of India) which is generated from run of the river hydro power plant. |

| Party | Project participant(s) | Party considered a project participant |
|-------|-------------------------------------|--|
| India | M/s Him Kailash Hydro Power Pvt Ltd | No |

II. Verification data:

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|------------------------|-------------------------------------|
| Contract party: | M/s Him Kailash Hydro Power Pvt Ltd |
|------------------------|-------------------------------------|

Verification team

| Role | Full name | Appointed for Sectoral Scopes | Affiliation |
|---------------------------|----------------------------|-------------------------------|--------------------------|
| Team Leader | Mr. Asim Kumar Jana | 1, 2, 3, 4, 5, 11, 12, 13 | TÜV Rheinland India Ltd. |
| Team Member | Mr. Sanjay Kumar Agarwalla | 1, 5, 11, 12 | TÜV Rheinland India Ltd. |
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III. Validation report data:

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| Final approval: <input checked="" type="checkbox"/> | Released on: 2011-06-12 By: Dr. Manfred Brinkmann | Designated Operational Entity (DOE): TÜV Rheinland Japan Ltd. Shin Yokohama Daini Center Bldg., 3-19-5, Shin Yokohama Kohoku-ku, Yokohama, JAPAN 222-0033 Tel.: +81 45 470-1850, Fax: +81 45 470-2361 E-mail: cdm@tuv.com |
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Introduction of combined report

The verification team assigned by the DOE (TÜV Rheinland Japan Ltd.) to perform the 1st Verification of the CDM Project Activity “5 MW Sahu Hydro Electric Project for a grid connected system in Himachal Pradesh, India” as described in the registered PDD (version 03, dated 06/02/2009) /P04-1/, has identified that the project implementation does not conform with the description in the registered PDD. Also the verification team has identified that the implementation of the monitoring system does not conform with the registered monitoring plan. Hence in accordance with paragraph 66 of EB 59, the validation of project design change and revision of monitoring plan has been included in one combined report (appearing in two parts i.e., part 1 of 2 and part 2 of 2) and submitted for approval. In this context a single revised PDD addressing both the changes along with the revised IRR cum sensitivity analysis spreadsheet is submitted.

VALIDATION OPINION/ Notification of Changes (part 1 of 2)

Validation opinion — summary

The verification team assigned by the DOE (TÜV Rheinland Japan Ltd.) to perform the 1st Verification of the CDM Project Activity “5 MW Sahu Hydro Electric Project for a grid connected system in Himachal Pradesh, India” as described in the registered PDD (version 03, dated 06/02/2009) /P04-1/, has identified that the project implementation does not conform with the description in the registered PDD. In particular, some of the technical details of the renewable electricity generators under project design are not as per the registered PDD.

Consequently the team has carried out a validation, in particular the re-assessment of the additionality of the project activity, scale of CDM project activity and the applicability of the Approved Baseline Methodology under which the project activity has been registered due to the permanent change in project design, in accordance with the:

- “Procedures for notifying and requesting approval of changes from the project activity as described in the registered Project Design Document” (EB48, Annex 66); and
- “Guidelines on Assessment of different Types of Changes from the Project Activity as described in the Registered PDD” (EB48, Annex 67).

Furthermore, re-assessment of the project’s investment analysis confirms that the additionality is not affected by the changes (i.e., the recalculated project IRR is still below the benchmark). Under sensitivity analysis the revised project IRR does not cross the benchmark with 10% increase in electricity generation and 10% decrease in the project cost. Moreover, the “Other barriers” as demonstrated in the registered PDD is still valid.

This validation confirms that the identified changes have no impact on the additionality, scale and the applicability of the baseline / monitoring methodology (AMS I.D, version 13). The DOE therefore concludes and notifies that the changes do not raise any concern with respect to aspects outlined in paragraph 10(c) of Annex 66 of EB 48.

1. Introduction

The organization, M/s Him Kailash Hydro Power Pvt. Ltd, has commissioned the DOE (TÜV Rheinland Japan Ltd.) to perform the 1st periodic verification of the CDM Project Activity “5 MW Sahu Hydro Electric Project for a grid connected system in Himachal Pradesh, India” in India (hereafter “project activity”). The UNFCCC reference number of this registered CDM project activity is 1753. In the course of this verification the verification team identified a set of permanent changes from the registered project activity and the project has never been implemented in accordance with the description in the registered PDD [EB48, Annex 66 – section 7 (a)]. In this context, the verification team has carried out the validation, in particular the re-assessment of the additionality of the project activity, scale of CDM project activity and the applicability of the Approved Baseline Methodology under which the project activity has been registered, due to the permanent change in project design, in accordance with the

“Guidelines on Assessment of different Types of Changes from the Project Activity as described in the Registered PDD “ and “Procedures for notifying and requesting approval of Changes from the Project activity as described in the registered Project Design Document”, published as Annex 67 and Annex 66 of EB 48 respectively. The summarised re-assessment report is presented in the following sections.

2. Supplementary Documents

The following table outlines the documentation reviewed during this re-assessment:

| Reference | Documents |
|-----------|---|
| /P01/ | Revised PDD, version 04, 03/05/2011 (clean and with track change). |
| /P02/ | Photographs of nameplates of hydro turbines and generators manufactured by Kunming Electrical Machinery Company Ltd, China. |
| /P03/ | Proof of date of commissioning of the project as on 22/04/2008 (= commercial operation start date). |
| /P04/ | 1. Registered PDD, version 03, dated 06/02/2009 2. Validation Report (by DNV), Revision 03, dated 20/04/2009. 3. IRR sheet on project page of 1753. |
| /P05/ | Revised IRR spreadsheet including sensitivity analysis. |
| /P06/ | Chartered Accountant certificate showing the comparison of the estimated project cost in the DPR (Detail Project Report) and the actual cost incurred with breakups. |
| /P07/ | Proof for supply and installation of 2 * 2500 kW Francis Turbine Generator units showing the total cost of the INR 78.07 million. |
| /P08/ | Literature on project cost (refer page 1 of 30): http://hydropower.inel.gov/techtransfer/pdfs/feasibility_studies_for_small_scale_hydropower_additions-16.pdf |

3. Summarised Findings of Reassessment

| Reference para of Annex 66 and 67 of EB 48 | Identified changes in comparison with registered PDD | Assessment | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|--|---|--------------------|---|--------------|--------------------------|--------------------|---|--------------------|--------|--------|---|--------------|-----------|-----------|--------|-----------|------------------------------------|--|---|--|--------------------------|---------------------------------|---|-----------------|-----------------|---------------|---|
| 10 (a) of Annex -66 | <p>Description of the changes:</p> <table><tr><th>SI No.</th><th>Parameter</th><th>Registered PDD (sections A.2 and A.4.2)</th><th>Actual Implemented</th></tr><tr><td>1</td><td>Turbine type</td><td>Horizontal Impulse wheel</td><td>Horizontal Francis</td></tr><tr><td>2</td><td>Generation voltage</td><td>3.3 kV</td><td>6.6 kV</td></tr><tr><td>3</td><td>Power factor</td><td>0.9 (lag)</td><td>0.8 (lag)</td></tr></table> <p>Due to above mentioned permanent changes from the registered project activity, the impact on the following two key parameters i.e. equipment cost and net electricity generation are discussed as below:</p> <table><tr><th>SI No.</th><th>Parameter</th><th>Registered PDD & Validation report</th><th>Changed value due to changes mentioned above</th></tr><tr><td>1</td><td>Electromechanical equipment cost consisting of hydro turbo generating unit, transmission line and evacuation system.</td><td>INR 91.86 million /P04/.</td><td>INR 88.09 million /P06/, /P07/.</td></tr><tr><td>2</td><td>Net electricity</td><td>20.75 GWh/annum</td><td>The estimated</td></tr></table> | SI No. | Parameter | Registered PDD (sections A.2 and A.4.2) | Actual Implemented | 1 | Turbine type | Horizontal Impulse wheel | Horizontal Francis | 2 | Generation voltage | 3.3 kV | 6.6 kV | 3 | Power factor | 0.9 (lag) | 0.8 (lag) | SI No. | Parameter | Registered PDD & Validation report | Changed value due to changes mentioned above | 1 | Electromechanical equipment cost consisting of hydro turbo generating unit, transmission line and evacuation system. | INR 91.86 million /P04/. | INR 88.09 million /P06/, /P07/. | 2 | Net electricity | 20.75 GWh/annum | The estimated | <p>These design changes were identified during on-site visit and confirmed by checking the name plates of the installed two turbines (Sr Number S 2006-23, Sr Number S 2006-24) and the two generators (Sr Number F 2006-23, Sr Number F 2006-24) /P02/ of the given project activity. Moreover, the turbine type change does not leads to technology degradation [Cp para 5(a) of Annex 67 of EB 48].</p> <p>Due to the changes in turbine type in the implemented project activity, the net electricity generation out of the installed rated generation capacity i.e. 2 units of 2.5 MW generators each has remained unaffected as compared to the</p> |
| SI No. | Parameter | Registered PDD (sections A.2 and A.4.2) | Actual Implemented | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Turbine type | Horizontal Impulse wheel | Horizontal Francis | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Generation voltage | 3.3 kV | 6.6 kV | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Power factor | 0.9 (lag) | 0.8 (lag) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SI No. | Parameter | Registered PDD & Validation report | Changed value due to changes mentioned above | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Electromechanical equipment cost consisting of hydro turbo generating unit, transmission line and evacuation system. | INR 91.86 million /P04/. | INR 88.09 million /P06/, /P07/. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Net electricity | 20.75 GWh/annum | The estimated | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| | | generation | /P04/ | net electricity (at evacuation point) for IRR computation is based on the difference of gross generation (at 51.5% annual PLF as stated in page 13 of the validation report /P04-2/) and total auxiliary consumption and losses (=8% of gross generation). Due to the above mentioned permanent changes in the project design, the gross generation and the auxiliary consumption including losses has not undergone any change because the head and water flow rate; transmission line and evacuation | registered PDD value. Due to the change in the turbine type from Horizontal Impulse wheel turbine to Horizontal Francis turbine, the cost related to the electro mechanical equipment i.e. hydro turbines, transmission line and evacuation system would reduce from INR 91.86 million (=81.84 + 3.52 + 6.50) /P04/ to INR 88.09 million (=78.07 + 3.52 + 6.50) /P06/, /P07/. On-site visit also confirms that there is no change in the transmission and evacuation system and points compared to the validated PDD. The literature survey /P08/ also confirms that the cost of Francis turbine is lesser than an Impulse type turbine for comparable head and flow. Due to this, the project cost reduces by 1.33% [= (91.86 - 88.09) / 283.2]. As per the registered PDD, the project was additional with even 10% decrease in the |
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| | <table border="1"> <tr> <td data-bbox="435 294 521 684"></td><td data-bbox="521 294 792 684"></td><td data-bbox="792 294 1187 684"> <p>system remains unaffected as these are site specific. Hence the net electricity figure remains unchanged.</p> </td></tr> </table> | | | <p>system remains unaffected as these are site specific. Hence the net electricity figure remains unchanged.</p> | <p>project cost. However, the verification team has further assessed the financial analysis by substituting this actual turbine cost in the validated IRR spread sheet, the project IRR works out as 12.21% (which is still below the benchmark).</p> <p>Further due to the turbine type change in a hydro power plant, there is no likely change in O & M cost as compared to the PDD /P04/. This is based on the professional judgement of the validation team.</p> |
| | | <p>system remains unaffected as these are site specific. Hence the net electricity figure remains unchanged.</p> | | | |
| <p>10 (b) along with 7 of Annex -66</p> | <p><i>When the changes have occurred?</i></p> <p>The project equipment design parameters as reported in the registered PDD (in sections A.2 and A.4.2) were taken from the Detailed Project Report (Cp section 3.1 and section 4.2 of the validation report).</p> <p>These identified permanent changes, as mentioned above, have occurred during project implementation.</p> <p><i>Whether the changes would have been known prior to registration of the project activity?</i></p> <p>These design parameters were deemed to be known prior to the registration of the project activity (Cp /P03/-date of commissioning on 22/04/2008) but they were incorrectly incorporated in the PDD by mistake. The same was incorrectly validated (mistakenly overlooked) (Cp section 4.2 of the validation report). PP did consider the 2*2500 kW Francis turbine generating</p> | <p>As the mentioned project design changes were known to the PP at the time of registration of the project activity and mistakenly stated in the PDD and validation report, this reassessment and notification has been performed by the 1st periodic verifying DOE i.e. TÜV Rheinland Japan Ltd. Nevertheless, as evaluated below the changes do not raise concerns with</p> | | | |

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| | <p>units for this given project site (before commencement of the validation i.e. 10/11/2007) as confirmed by the purchase order for the same to Sanghai Leichun (I Trading Company Ltd.), dated 09/11/2005 /P07/.</p> <p>Reason of changes:</p> <p>As the actual project design features (i.e. turbine type, generation voltage and power factor) were known to the PP at the time of registration of the project activity, but not reflected correctly in the registered PDD and validation report, these changes are of mere editorial type.</p> <p>How the changes would impact the overall operation/ability of the project activity to deliver emission reductions as stated in the PDD?</p> <p>Due to change in the above mentioned parameters of the turbine, there will be no impact on the net annual electricity generation by the project activity due to no change in rated capacity of each unit, i.e., 2.5 MW_e. Hence there will not be any impact on the emission reductions as stated in the PDD.</p> | <p>respect to the aspects mentioned under paragraph 10 (b) of Annex 66 of EB 48.</p> |
| 10 (C- i) of Annex -66 (= B of Annex 67) | <p>Additionality of the project activity:</p> <p>Additionality of the project activity was validated based on Investment barrier and Other barriers.</p> <p>Due to the above changes (as mentioned under “Description of changes”), reassessment of the Investment barrier, by substituting the changed project cost (due to change in turbine type from Impulse to Francis type), the recalculated project IRR works out as 12.21% which is less than the recalculated ¹ benchmark. Moreover, the sensitivity analysis with an increase in 10% electricity generation and decrease in 10% project cost, the project IRR does not cross the revised benchmark. Hence there is no impact on the additionality of the project activity. In this context, revised IRR sheet incorporating revised sensitivity analysis /P05/ have been checked and found OK.</p> | <p>Re-assessment of the Investment barrier in the revised computation (by simple substitution of the decreased equipment cost in the validated IRR spread sheets /P04-3/ of 1753 project page), revised IRR with revised sensitivity analysis sheet /P05/ provided by the PP confirms that the computation and the corresponding</p> |

¹ The benchmark was established based on Weighted Average Cost of Capital (WACC approach). As the debt component of the project is based on loan sanctioned for the project activity, due to decrease in the actual project cost, the equity component decreases and due to this the WACC also decreases marginally from 14.34% to 14.20%.

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| | <p>Moreover, the validated “Other barriers” [a) Geological Risk, b) Lack of Infrastructure and c) Uncertainty in Hydrology] do not get affected by the above mentioned project features and the project still remains additional</p> | <p>underlying values are correct.</p> <p>Under sensitivity analysis the project IRR does not cross the revised benchmark with 10% increase in generation and 10% decrease in project cost. The project IRR crosses the revised benchmark when the generation goes up by 12% and project cost decreases by 10.7% which is most unlikely as explained in the validation report page 19 /P04-2/.</p> <p>Also the validated “Other barriers” /P04-2/ remains unaffected by these minor changes in the project features and the project still remains additional.</p> <p>These changes are considered as minor in nature as per Annex 66 of EB 48. In the same context this notification to CDM EB is filed.</p> |
| 10 (C- ii) of Annex -66 (= C of Annex 67) | <p>Scale of CDM project activity:</p> <p>No change of scale of the project activity.</p> | <p>The installed capacity of the project activity does not change and remains 5 MW_e. (= <15MWe). Hence the installed aggregated</p> |

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| | | capacity remains under the eligibility limit for Type I small-scale CDM project activity, i.e., 15 MW _e . |
| 10 (C- iii) of Annex -66 (= D of Annex 67) | <p>Applicability and application of Approved Baseline Methodology under which the project activity has been registered:</p> <p>AMS I.D, version 13 is still complied.</p> | The applicability criteria of the applied methodology remain unaffected as there is no change in technology of renewable electricity generation and the validated baseline scenario remains valid. |

VALIDATION OPINION of the revision of monitoring plan of the registered CDM Project Activity (part 2 of 2)

Validation opinion — summary

The verification team assigned by the DOE (TÜV Rheinland Japan Ltd.) to perform the 1st periodic verification of the CDM Project Activity “5 MW Sahu Hydro Electric Project for a grid connected system in Himachal Pradesh, India” as described in the registered PDD (version 03, dated 06/02/2009) /P04-1/, has identified that the implementation of the monitoring system does not conform with the registered monitoring plan.

Consequently the team has carried out a validation of the revised monitoring plan in accordance with the

- “Procedures for revising monitoring plans in accordance with paragraph 57 of the modalities and procedures for CDM” (§ 9 of Annex 28 of EB 49)

This revision enhances the level of accuracy and completeness of the monitoring plan and would remain valid for the entire 10 years fixed crediting period.

Validation opinion in accordance with paragraph 9 of annex 28 of EB 49

(a) Level of accuracy and completeness

- ☒ TUV Rheinland herewith confirms that the proposed revision of the monitoring plan ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced.

The assessment of each proposed changes in the revised monitoring plan in comparison with the registered PDD are presented in the tabulated form as below:

Table (a).1

| Elements of Comparison | Points/ reference in registered MP undergone changes | Proposed changes in revised MP | Assessment by the verification team with the reference of objective evidence, if relevant. |
|--|--|--|--|
| "Value of data" in the table of monitoring parameter "EG _{gross,y} " | 22.56 GWh | 22.56 | The data unit is not required for this row. Hence the revision is appropriate. |
| "Description of measurement methods and procedures to be applied:" in the table of monitoring parameter "EG _{gross,y} " | Measured monthly.....one set of Main meter (part of interconnection facilities) and check meter will be provided by the company and the HPSEB at the interconnection point. Monthly joint meter readings of the main meter and check meter Authorised representatives of both the parties on each of the based instances, based on. | Measurement methods and procedures compiled monthly and aggregated annually. | Actual monitoring of this given parameter is neither followed as per the monitoring plan of the registered PDD nor relevant in the context of this monitoring parameter. The changes made in the revised monitoring plan reflect the actual monitoring activity and found relevant to the monitoring parameter "EG _{gross,y} ". Moreover, the changes are also in line with the SSC-CDM-PDD completing guidelines. The supporting evidences verified on-site are referred in Annex 1 of this report /P09/, /P10/, /B06/, /B07/. |
| "QA/QC procedures to be applied (if any):" in the table of monitoring parameter | The main meter Prudent Utility Practices". | "Measurement will be carried by calibrated meters". | Actual QA/QC procedure of this given parameter is neither followed as per the monitoring plan of the registered PDD nor relevant in the context of this monitoring parameter. The |

| Elements of Comparison | Points/ reference in registered MP undergone changes | Proposed changes in revised MP | Assessment by the verification team with the reference of objective evidence, if relevant. |
|--|--|--|---|
| "EG _{gross,y} " | | | changes made in the revised monitoring plan reflect the actual QA/QC procedures and found relevant to the monitoring parameter "EG _{gross,y} ". |
| "Description" in the table of monitoring parameter "EG _{Auxiliary,y} " | Auxiliary electricity consumption of the project. | Auxiliary electricity consumption of the project in the year y. | The change reflects the complete description of the parameter. |
| "Value of data" in the table of monitoring parameter "EG _{Auxiliary,y} " | 1.81 GWh (8%) | 0.113 | The data unit is not required for this row. Moreover, the value reflects the correct auxiliary consumptions (=reflecting self consumption of the generation units) based on the paragraph no 2.2.6 of Power Purchase Agreement (PPA) /P11/ which allows to consider 0.5 % generated electricity as auxiliary electricity consumption. The higher value (of 8% of gross generation) in the registered PDD reflected <u>combined value</u> of auxiliary consumption, outages and transmission losses. Hence the revision is correct and appropriate as well. |
| "Description of measurement methods and procedures to be applied:" in the table of monitoring parameter "EG _{Auxiliary,y} " | Measured monthly project activity." | Measurement methods and procedures compiled monthly and aggregated annually. | The measurement method and procedure described in the registered PDD for this parameter does not represent the direct measurement of auxiliary electricity consumption. The changes made in the revised monitoring plan reflect the actual monitoring activity and found relevant to the monitoring parameter "EG _{Auxiliary,y} ". Moreover, the changes are in line with the |

| Elements of Comparison | Points/ reference in registered MP undergone changes | Proposed changes in revised MP | Assessment by the verification team with the reference of objective evidence, if relevant. |
|---|--|---|--|
| | | | SSC-CDM-PDD completing guidelines. The supporting evidences verified on-site are referred in Annex 1 of this report /P12/, /P13/, /B06/, /B07/. |
| "QA/QC procedures to be applied (if any):" in the table of monitoring parameter "EG _{Auxiliary,y} " | Meters will be calibratedare provided here. | "Measurement will be carried by calibrated meters." | Actual QA/QC procedure of this given parameter is neither followed as per the monitoring plan of the registered PDD nor relevant in the context of this monitoring parameter. The changes made in the revised monitoring plan reflect the actual QA/QC procedures and found relevant to the monitoring parameter "EG _{Auxiliary,y} ". |
| "Data / Parameter" in the table of monitoring parameter "EG _{export,y} " | "EG _y " | "EG _{export,y} " | The change reflects the correct representation of the description of the parameter, quantity of electricity exported to grid "EG _{export,y} ". |
| "Data Unit" in the table of monitoring parameter "EG _{export,y} " | kWh | GWh | The change reflects the consistency in the unit of the parameter with other electricity parameters. |
| "Description" in the table of monitoring parameter "EG _{export,y} " | Net power exported to grid | Quantity of Electricity exported (to grid) by the project plant during the year y | The change reflects the correct representation of the description of the parameter, quantity of electricity exported to grid "EG _{export,y} ". |
| "Source of data to be used" in the table of monitoring parameter "EG _{export,y} " | On site measurement | Measurement at grid sub-station | The change reflects the actual monitoring system of "EG _{export,y} " /P14/. |
| "Value of data" in the table of monitoring | 20.75 GWh | 20.75 | The data unit is not required for this row. Hence the revision is appropriate. |

| Elements of Comparison | Points/ reference in registered MP undergone changes | Proposed changes in revised MP | Assessment by the verification team with the reference of objective evidence, if relevant. |
|---|---|---|---|
| parameter “EG _{export,y} ” | | | |
| “Description of measurement methods and procedures to be applied” in the table of monitoring parameter “EG _{export,y} ” | For measuring the energy the above instances. | Measurement methods and procedures and aggregated annually. | <p>The changes made in the revised monitoring plan reflect the actual monitoring activity and found relevant to the monitoring parameter “EG_{export,y}”.</p> <p>As per the PPA, main and check meters will be subjected to calibration by HPSEB at the interval of every six months. But the calibration records shows that actual calibration was delayed which is beyond the control of the PP. Hence in accordance with para 7, footnote 3 of Annex 60 of EB 52, the change in calibration frequency in the revised monitoring plan (from six to twelve months) is OK. The revised frequency of 12 months also meets the national standard, i.e., CEA (Installation and Operation of Meters) Regulations, 2006 /B06/ and within at least three (3) years as prescribed by the General Guidelines of EB.</p> <p>Moreover, the changes are in line with the SSC-CDM-PDD completing guidelines. The supporting evidences verified on-site are referred in Annex 1 of this report /P15/, /P16/.</p> |
| “QA/QC procedures to be applied (if any)” in the table of monitoring parameter | “The main meter and check Prudent Utility Practices.” | “Measurement will be export electricity figure.” | <p>The changes made in the revised monitoring plan reflect the actual QA/QC procedures and found relevant to the monitoring parameter “EG_{export,y}”.</p> <p>Moreover, the changes are in line with the SSC-CDM-</p> |

| Elements of Comparison | Points/ reference in registered MP undergone changes | Proposed changes in revised MP | Assessment by the verification team with the reference of objective evidence, if relevant. |
|---|---|---|---|
| "EG _{export,y} " | | | PDD completing guidelines. The supporting evidences verified on-site are referred in Annex 1 of this report. |
| "Description" in the table of monitoring parameter "EG _{import,y} " | Grid electricity import to the project activity during the year y | Quantity of Electricity imported (from grid) by the project plant during the year y | The change reflects the correct representation of the description of the parameter, quantity of electricity imported from grid "EG _{import,y} ". |
| "Source of data to be used" in the table of monitoring parameter "EG _{import,y} " | On site measurement | Measurement at grid sub-station | The change reflects the actual monitoring system "EG _{import,y} ". |
| "Value of data" in the table of monitoring parameter "EG _{import,y} " | 0 GWh | 0 | The data unit is not required for this row. Hence the revision is appropriate. |
| "Description of measurement methods and procedures to be applied" in the table of monitoring parameter "EG _{import,y} " | Measured monthlyaggregated annually. | Measurement methods and procedures and aggregated annually." | The changes made in the revised monitoring plan reflect the actual monitoring activity and found relevant to the monitoring parameter "EG _{import,y} ". As per the PPA, main and check meters will be subjected to calibration by HPSEB at the interval of every six months. But the calibration records shows that actual calibration was delayed which is beyond the control of the PP. Hence in accordance with para 7, footnote 3 of Annex 60 of EB 52, the change in calibration frequency in the revised monitoring plan (from six to twelve months) is OK. The revised frequency of 12 months also meets the national standard, i.e., CEA (Installation and Operation of |

| Elements of Comparison | Points/ reference in registered MP undergone changes | Proposed changes in revised MP | Assessment by the verification team with the reference of objective evidence, if relevant. |
|--|--|--|---|
| | | | <p>Meters) Regulations, 2006 /B06/ and within at least three (3) years as prescribed by the General Guidelines of EB.</p> <p>Moreover, the changes elaborate the description completely and are in line with the SSC-CDM-PDD completing guidelines. The supporting evidences verified on-site are referred in Annex 1 of this report /P15/, /P16/.</p> |
| “QA/QC procedures to be applied (if any)” in the table of monitoring parameter “EG _{import,y} ” | Meters will be calibrated provided here. | ““Measurement will be import electricity figure.”” | <p>The changes made in the revised monitoring plan reflect the actual QA/QC procedures and found relevant to the monitoring parameter “EG_{import,y}”. Moreover, the changes are in line with the SSC-CDM-PDD completing guidelines. The supporting evidences verified on-site are referred in Annex 1 of this report.</p> |
| Table of the monitoring parameter “EG _{m,y} ” | Not incorporated. | Incorporated in the revised MP. | <p>The net electricity export to grid “EG_{m,y}” (Cp section B.6.1 of the PDD) serves as the basis of emission reduction calculation. Hence this parameter is imperative to be a part of the MP.</p> <p>This additional monitoring parameters would enhance the completeness and correctness of the monitoring plan (Cp para 202 of the VVM) /B04/ and also demonstrate the conservative value applied for CER calculation.</p> |
| “Data Parameter” in the table of | “F _{i,y} ” | “F _{diesel,y} ” | The change reflects the correct representation of the description of the parameter, |

| Elements of Comparison | Points/ reference in registered MP undergone changes | Proposed changes in revised MP | Assessment by the verification team with the reference of objective evidence, if relevant. |
|--|--|--|--|
| monitoring parameter "F _{diesel,y} " | | | quantity of diesel consumed for running of DG set "F _{diesel,y} ". |
| "Data Unit" in the table of monitoring parameter "F _{diesel,y} " | Tonnes/kilo liters | Liters | The change reflects the actual measured unit of diesel quantity. |
| "Description" in the table of monitoring parameter "F _{diesel,y} " | Quantity of fossil year y. | Quantity of Diesel ... during year y. | The change reflects the correct representation of the description of the parameter, quantity of diesel consumed in running of DG set. |
| "Source of data to be used" in the table of monitoring parameter "F _{diesel,y} " | On site measurement | Plant records | The change reflects the appropriate source of data. |
| "Description of measurement methods and procedures to be applied" in the table of monitoring parameter "F _{diesel,y} " | "The total number will be recorded." | The totalusing level gauge will be recorded." | The changes made in the revised monitoring plan reflect the actual monitoring activity and found relevant to the monitoring parameter. |
| "QA/QC procedures to be applied (if any)" in the table of monitoring parameter "F _{diesel,y} " | "The weigh bridge purchase receipts." | "The data recorded purchase receipts." | During on site visit it was revealed that there was no weighbridge meter installed. The changes made in the revised monitoring plan reflect the actual QA/QC procedures and found relevant to the monitoring parameter. |
| "Any comment" in the table of monitoring parameter "F _{diesel,y} " | Not incorporated | "Data will be archived occurs later". | The change made in the revised monitoring plan is deemed appropriate. |
| Table of the | Not incorporated. | Incorporated in the | This additional monitoring |

| Elements of Comparison | Points/ reference in registered MP undergone changes | Proposed changes in revised MP | Assessment by the verification team with the reference of objective evidence, if relevant. |
|--|---|--|--|
| monitoring parameter “ ρ_{diesel} ” | | revised MP. | parameter complements parameter “ $F_{\text{diesel,y}}$ ” and thereby would enhance the completeness and correctness of the monitoring plan for determination of project emissions (Cp para 202 of the VVM) /B04/. |
| Paragraphs in section B.7.2 | <u>Monitoring Requirements</u> The monitoring plan 10 years. Monitoring equipment at regular intervals. | <u>Monitoring Requirements</u> The monitoring plan diesel consumption, density of diesel. Baseline emissionsand project emissions due to usage of diesel consumption will be calculated 10 years. Monitoring equipment ... gross energy generation, auxiliary consumption, energy exportedenergy imported by the project. One set of at grid grid substation to monitor export and import electricity for the project activity. These sub-station meters are under the control of HPSEB. Calibration will be done as per national standards. Project proponent will ensure to calibrate by HPSEB. Projectat regular.intervals. | The highlighted revisions improve the completeness of the information. |
| Paragraphs in | <u>QA & QC Procedures</u> | <u>QA & QC Procedures</u> | The highlighted revisions |

| Elements of Comparison | Points/ reference in registered MP undergone changes | Proposed changes in revised MP | Assessment by the verification team with the reference of objective evidence, if relevant. |
|-----------------------------|---|---|--|
| section B.7.2 | The project shall employrecorded data.. | The project shall employ monitoring equipments conforming to national standard. Necessary check meter as required would be installed, to operate in parallel to main meter. In case of abnormality in the main meter, the reading of check meter would serve as a basis for net electricity figure. All metersrecorded data. | reflect the actual QA/QC procedure of the implemented monitoring system and improve the completeness of the information. |
| Paragraphs in section B.7.2 | <u>Data Recording and Storage</u> For measuringon this document. The above occurs later. | <u>Data Recording and Storage</u> For measuringwill sign the JMRon this JMR . The JMRs ... occurs later. | The highlighted revisions reflect the actual data recording and storage practice of the implemented monitoring system and improve the completeness of the information. The supporting evidences verified on-site are referred in Annex 1 of this report /P17/. |
| Whole MP | Whole MP covering section B.7 and Annex 4 of the PDD. | Editorial changes which are not addressed above. | The editorial changes improves the level of accuracy and completeness of the MP. |

The assessment of each proposed changes as mentioned in Table (a).1 above in the revised monitoring plan with respect to frequency of measurement (of the monitoring parameters) and calibration requirements and QA/QC procedures (monitoring equipment) are presented in the tabulated form as below:

Table (a).2

| Monitoring parameter | Impact on frequency of measurement | | Monitoring Equipment | Impact on calibration requirements | Impact on QA/QC procedures |
|---------------------------------|---|--|--------------------------|---|--|
| EG_{gross,y} | <input checked="" type="checkbox"/> Yes, with explanation: Reworded to “Continuously measured”. <input type="checkbox"/> No impact | | <i>Generation meters</i> | <input checked="" type="checkbox"/> Yes, with explanation: Due to corrections of the monitoring devices, the calibration aspects are appropriately addressed. <input type="checkbox"/> No impact | <input checked="" type="checkbox"/> Yes, with explanation: Due to corrections of the monitoring devices, the QA/QC aspects are appropriately addressed. <input type="checkbox"/> No impact |
| EG_{Auxiliary,y} | <input checked="" type="checkbox"/> Yes, with explanation: Reworded to “Continuously measured”. <input type="checkbox"/> No impact | | <i>Auxiliary meter</i> | <input checked="" type="checkbox"/> Yes, with explanation: Due to corrections of the monitoring method, the calibration aspects are appropriately addressed. <input type="checkbox"/> No impact | <input checked="" type="checkbox"/> Yes, with explanation: Due to corrections of the monitoring method, the QA/QC aspects are appropriately addressed. <input type="checkbox"/> No impact |
| EG_{export,y} | <input checked="" type="checkbox"/> Yes, with explanation: Reworded to “Continuously measured”. <input type="checkbox"/> No impact | | Main and check meters | <input checked="" type="checkbox"/> Yes, with explanation: Calibration frequency has been changed from six months to twelve months in accordance with para 7, footnote 3 of Annex 60 of EB 52. <input type="checkbox"/> No impact | <input checked="" type="checkbox"/> Yes, with explanation: Due to consistency with actual monitoring system, the QA/QC aspects are appropriately addressed. <input type="checkbox"/> No impact |

| Monitoring parameter | Impact on frequency of measurement | | Monitoring Equipment | Impact on calibration requirements | Impact on QA/QC procedures |
|---------------------------------|---|--|-----------------------|---|--|
| | | | | <input type="checkbox"/> No impact | No impact |
| EG_{import,y} | <input checked="" type="checkbox"/> Yes, with explanation: Reworded to "Continuously measured". <input type="checkbox"/> No impact | | Main and check meters | <input checked="" type="checkbox"/> Yes, with explanation: Calibration frequency has been changed from six months to twelve months in accordance with para 7, footnote 3 of Annex 60 of EB 52. <input type="checkbox"/> No impact | <input checked="" type="checkbox"/> Yes, with explanation: Due to consistency with actual monitoring system, the QA/QC aspects are appropriately addressed. <input type="checkbox"/> No impact |
| EG_{m,y} | Not applicable as it is a new parameter introduced. | | Not applicable. | Not applicable. | Not applicable. |
| F_{diesel,y} | <input type="checkbox"/> Yes, with explanation: <input checked="" type="checkbox"/> No impact | | Level gauge | <input type="checkbox"/> Yes, with explanation: <input checked="" type="checkbox"/> No impact | <input checked="" type="checkbox"/> Yes, with explanation: Correctly addressed by introducing means of cross checking. <input type="checkbox"/> No impact |
| ρ diesel | Not applicable | | Not applicable | Not applicable | Not applicable |

(b) Accordance with approved monitoring methodology

- ☒ *TUV Rheinland herewith confirms that the proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity.*

The project activity was registered on 24/06/2009 under version 13 of AMS I.D., which is also the basis of first periodic verification. The proposed revised monitoring plan does not apply the latest version of AMS I.D., however, correctly follows the applied methodology i.e. AMS I.D. version 13 at the time of registration. Paragraph 13 of the applied methodology states "Monitoring shall consist of metering the electricity generated by the renewable technology". Hence in accordance with the applied methodology, the electricity generated by the renewable project i.e. hydro power plant, will be monitored. The export and import electricity will also be monitored at the electricity evacuation (to the grid) point. This monitoring of export and import of electricity does comply with § 22 of 15th meeting report of CDM SSC WG. The verification team has made the onsite visit and reviewed the implemented monitoring system and reached the conclusion that revised MP is acceptable and complies with version 13 of AMS I.D.

(c) Previous verification findings

- ☒ *TUV Rheinland herewith confirms that the findings of previous verification reports, if any, have been taken into account.*
- ☐ *No findings from previous verifications had to be considered.*

This is the first periodic verification for the monitoring period 24/06/2009 to 28/02/2010 (both days included). Hence this criterion is not applicable.

Annexure 1

Reference of objective evidence

Documents provided by the project participant:

| Refer ence | Documents |
|---------------|---|
| /P09/ | Technical specification of the installed electricity generation meters. |
| /P10/ | Sample copy of log book records for electricity generation records. |
| /P11/ | Extract of Power Purchase Agreement (PPA) with Himachal Pradesh State Electricity Board indicating auxiliary electricity consumption. |
| /P12/ | Technical specification of the installed auxiliary electricity consumption meters. |
| /P13/ | Sample copy of log book records for auxiliary electricity consumption records. |
| /P14/ | Evidence of the main and check meters installed at grid sub-station. |
| /P15/ | Technical specifications of the main and check meters. |
| /P16/ | Calibration certificates of the main and check meters. |
| /P17/ | Sample copy of Joint Meter Reading (JMR). |

Background investigation and other referred documents/websites:

| Refer ence | Document |
|---------------|---|
| /B01/ | Approved CDM Methodology AMS-I.D. version 13: "Grid connected renewable electricity generation". |
| /B02/ | Kyoto Protocol (1997). |
| /B03/ | Decision 3/CMP. 1 (Marrakesh – Accords). |
| /B04/ | UNFCCC Validation and Verification Manual (Version 1.2). |
| /B05/ | Procedure for revising monitoring plans in accordance with para 57 of the Modalities and Procedures for the CDM, version 02, Annex 28 of EB 49. |
| /B06/ | CEA (Installation and Operation of Meters) Regulation 2006. |
| /B07/ | Websites referred <ul style="list-style-type: none"> http://cdm.unfccc.int/index.html |

Qualification

Jana, Asim Kumar /

Emission Trading United Nations Framework Convention on Climate Change

Auditor No.:
(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level:
(Qualifikationsstufe)

External:
(Externer)

☐ ja

Add. reviewer:
(Zusätzlicher Prüfer)

☐ yes

EAC Scopes:
(EAC Branchen)

CDM 01 – Energy industries (renewable – / non-renewable sources)
CDM 03 – Energy demand
CDM 04 – Manufacturing industries
CDM 12 – Solvents use
CDM 02 – Energy distribution
CDM 11 – Fugitive emissions from production and consumption of
halocarbons and sulphur hexafluoride
CDM 13 – Waste handling and disposal
CDM 05 – Chemical industry

Add. qualification:
(zus. Qualifikation)

First Appointment:
(Erstberufung)

2009/06/02

Valid to:
(Gültig bis)

2012/06/01

Remarks:

2010–10: revised to meet Accreditation Standard Ver.02:
– CDM 01: valid for TA1.1, 1.2
– CDM 02: valid for TA2.1, 2.2
– CDM 03: valid for TA3.1
– CDM 04: valid for TA4.5 – Other WHR and Fuel switch projects
– CDM 05/11/12: valid for TA5.1 / 11.1 / 12.1
– CDM 13: valid for TA13.1 – Waste handling and disposal

Languages:

Hindi
English

Experience Exchange

Date

Location

Remarks

Accreditation(s)

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next Monitoring:
(nächste Beurteilung)

Remarks:

[View / Edit Monitoring](#)

History of scope allocation

Date: 2009-06-03
Change: EAC CDM, CDM, CDM, CDM added
By: Manfred Brinkmann
Reason: scope 4 limited to fuel switch

History

| | | |
|-----------|--------------------------|---------------------------|
| Created: | 2009/04/21 19:24:07 ZE5B | Asim Kumar Jana/Ind/TUV |
| Modified: | 2011/01/06 11:55:54 | Manfred Brinkmann/Jpn/TUV |
| | 2010/09/12 18:07:27 | Manfred Brinkmann/Jpn/TUV |

Qualification

Deka, Raj Kumar /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No.:

(AuditorenRegNr)

Appointed:

(Zugelassen)

☒ ja

Qualification Level:

(Qualifikationsstufe)

Auditor

External:

(Externer)

☐ ja

Add. reviewer:

(Zusätzlicher Prüfer)

☐ yes

EAC Scopes:

(EAC Branchen)

CDM 01 - Energy industries (renewable - / non-renewable sources)

CDM 02 - Energy distribution

CDM 03 - Energy demand

Add. qualification:

(zus. Qualifikation)

First Appointment:

(Erstberufung)

2010/10/24

Valid to:

(Gültig bis)

2013/10/23

Remarks:

CDM 01: limited to TA 1.2 (Renewable Energies)

CDM 02: incl. TA 2.1, 2.2

CDM 03: incl. TA 3.1

Languages:

Hindi

English

Experience Exchange

Date

Location

Remarks

Accreditation(s)

Monitoring

Latest Monitoring:

(letzte Beurteilung)

Next Monitoring:

(nächste Beurteilung)

Remarks:

[View / Edit Monitoring](#)

History of scope allocation

Date:
Change:
By:
Reason:

Date:
Change:
By:
Reason:

Date: 2010-10-24
Change: EAC CDM, CDM, CDM added
By: Manfred Brinkmann
Reason: CDM 01: limited to TA 1.2 (Renewable Energies)

History

| | | |
|-----------|---------------------|---------------------------|
| Created: | 2008/07/02 22:58:00 | Manfred Brinkmann/Jpn/TUV |
| Modified: | 2010/10/24 11:27:19 | Manfred Brinkmann/Jpn/TUV |
| | 2010/10/24 11:27:13 | Manfred Brinkmann/Jpn/TUV |
| | 2010/10/24 11:26:55 | Manfred Brinkmann/Jpn/TUV |
| | 2008/07/02 22:58:29 | Manfred Brinkmann/Jpn/TUV |

Qualification

Agarwalla, Sanjay Kumar /

Emission Trading United Nations Framework Convention on Climate Change

Auditor No.:
(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level:
(Qualifikationsstufe)

Auditor

External:
(Externer)

☐ ja

Add. reviewer:
(Zusätzlicher Prüfer)

☐ yes

EAC Scopes:
(EAC Branchen)

CDM 01 – Energy industries (renewable – / non-renewable sources)
CDM 05 – Chemical industry
CDM 11 – Fugitive emissions from production and consumption of
halocarbons and sulphur hexafluoride
CDM 12 – Solvents use

Add. qualification:
(zus. Qualifikation)

First Appointment:
(Erstberufung)

2011/02/09

Valid to:
(Gültig bis)

2014/02/08

Remarks:

Valid for TA 1.2, 5.1/11.1/12.1

Languages:

Hindi
English

Experience Exchange

Date

Location

Remarks

Accreditation(s)

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next Monitoring:
(nächste Beurteilung)

Remarks:

[View / Edit Monitoring](#)

History of scope allocation

Date:

2011-02-09

Change:

EAC CDM, CDM, CDM, CDM added

By:

Manfred Brinkmann

Reason:

Valid for TA 1.2, 5.1/11.1/12.1

History

| | | |
|-----------|--------------------------|--------------------------------|
| Created: | 2011/02/08 08:59:20 ZE5B | Sanjay Kumar Agarwalla/Ind/TUV |
| Modified: | 2011/02/09 14:00:27 | Manfred Brinkmann/Jpn/TUV |
| | 2011/02/08 08:59:38 ZE5B | Sanjay Kumar Agarwalla/Ind/TUV |

Qualification

Mane, Dinesh /

Emission Trading United Nations Framework Convention on Climate Change

Auditor No.:
(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level:
(Qualifikationsstufe)

Auditor

External:
(Externer)

☐ ja

Add. reviewer:
(Zusätzlicher Prüfer)

☐ yes

EAC Scopes:
(EAC Branchen)

CDM 13 – Waste handling and disposal

Add. qualification:
(zus. Qualifikation)

First Appointment:
(Erstberufung)

2011/02/07

Valid to:
(Gültig bis)

2014/02/06

Remarks:

Valid for TA 13.1

Languages:

Hindi
English
Indian

Experience Exchange

Date

Location

Remarks

Accreditation(s)

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next Monitoring:
(nächste Beurteilung)

Remarks:

[View / Edit Monitoring](#)

History of scope allocation

Date
(Datum)

2011-02-07

Change
(Änderung)

EAC CDM added

By
(durch)

Manfred Brinkmann

Reason
(Begründung)

Valid for TA 13.1

History

Created:

2011/02/04 15:40:22 ZE5B

Dinesh M Mane/Ind/TUV

Modified:

2011/02/07 17:52:46

Manfred Brinkmann/Jpn/TUV

| | |
|--------------------------|---------------------------|
| 2011/02/07 17:52:41 | Manfred Brinkmann/Jpn/TUV |
| 2011/02/07 17:52:40 | Manfred Brinkmann/Jpn/TUV |
| 2011/02/07 17:52:16 | Manfred Brinkmann/Jpn/TUV |
| 2011/02/07 17:51:55 | Manfred Brinkmann/Jpn/TUV |
| 2011/02/04 15:40:35 ZE5B | Dinesh M Mane/Ind/TUV |

Qualification

Urs, Praveen /

Emission Trading United Nations Framework Convention on Climate Change

Auditor No.:
(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level:
(Qualifikationsstufe)

External:
(Externer)

☐ ja

Add. reviewer:
(Zusätzlicher Prüfer)

☒ yes

EAC Scopes:
(EAC Branchen)

CDM 01 – Energy industries (renewable – / non-renewable sources)
CDM 13 – Waste handling and disposal

Add. qualification:
(zus. Qualifikation)

First Appointment:
(Erstberufung)

2010/08/31

Valid to:
(Gültig bis)

2013/08/30

Remarks:

Valid for TA 01.2, 13.1

Languages:

Hindi
English

Experience Exchange

Date

Location

Remarks

Accreditation(s)

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next Monitoring:
(nächste Beurteilung)

Remarks:

[View / Edit Monitoring](#)

History of scope allocation

Date: 2010-11-17
Change: EAC CDM, CDM added
By: Manfred Brinkmann
Reason: Valid for TA 01.2, 13.1

History

Created: 2010/11/17 11:47:44

Manfred Brinkmann/Jpn/TUV

Modified:

2010/11/17 11:54:09
2010/11/17 11:48:19

Manfred Brinkmann/Jpn/TUV
Manfred Brinkmann/Jpn/TUV