



Verification and certification report form for CDM project activities

(Version 01.0)

Complete this form in accordance with the "Attachment: Instructions for filling out the verification and certification report form for CDM project activities" at the end of this form.

VERIFICATION AND CERTIFICATION REPORT

Title of the project activity	24 MW Dummagudem Hydel project by SLS Power Corporation Limited
Reference number of the project activity	4818
Version number of the verification and certification report	01
Completion date of the verification and certification report	15/03/2016
Monitoring period number and duration of this monitoring period	01 Duration – 538 days (from 10/10/2013 to 31/03/2015)
Version number of monitoring report to which this report applies	2.1
Crediting period of the project activity corresponding to this monitoring period	10/10/2013 – 09/10/2023
Project participant(s)	SLS Power Corporation Limited
Host Party	India
Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)	Sectoral Scope: 01- Energy Industries (renewable - / non-renewable sources) Methodology: Approved consolidated baseline and monitoring methodology ACM0002, version 11
Estimated GHG emission reductions or net anthropogenic GHG removals for this monitoring period in the registered PDD	131,577 tCO ₂
Certified GHG emission reductions or net anthropogenic GHG removals for this monitoring period	48,162 tCO ₂
Name of DOE	EPIC Sustainability Services Private Limited (EPIC)
Name, position and signature of the approver of the verification and certification report	 Mr. K. Sudheendra (Head-Operations)

SECTION A. Executive summary

EPIC Sustainability Services Private Limited (EPIC) has been contracted by M/s SLS Power Corporation Limited to undertake the first periodic independent verification of the registered CDM project activity titled "24 MW Dummagudem Hydel project by SLS Power Corporation Limited" (UNFCCC reference number: 4818). The objectives of this verification are to verify and certify emission reductions reported for project activity for the monitoring period of 10/10/2013 to 31/03/2015 (first and last day included); and to verify that the data reported are complete and transparent.

This report summarizes the findings of the verification of the project, performed on the basis of UNFCCC criteria for CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to the Kyoto Protocol, the CDM rules and modalities as agreed in the Bonn Agreement, the Marrakech Accords and the CDM Executive Board's decisions.

The verification team has, based on the recommendations in the Validation and Verification Standard/1/, and employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generations of CERs. The verification is not meant to provide any consulting towards the client. However, stated request for clarifications and/or corrective actions may provide input for improvement of the project design.

The scope of the verification is the independent and objective review and ex-post determination of the monitored reductions in GHG emission by the project activity. The verification is based on the validated project design document (version 5.0, dated 15/12/2013)/2/ (hereinafter validated PDD), corresponding validation report/2/ and its corresponding verification reports/2/. These documents were reviewed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

The project is 24 MW run-off river hydro power plant installed across the Godavari river at Dummagudem village, Kammam District, Andhra Pradesh. It involves installation of six Horizontal Pit Type Full Kaplan turbine & generation capacity of each generator is 4 MW to generate 24 MW of power utilizing a rated head of 4.8 m and design discharge of 601.02 m³.

The power is generated at 11 kV and stepped up to 132 kV at the Powerhouse switchyard and transmitted to 132/33 kV Bhadrachallam substation which is 20 km away from the power plant. In Bhadrachallam substation the metering is done at 132 kV through energy meters. The energy is wheeled through southern grid and sold to Tata Power through a wheeling agreement with APTRANSCO and Power Purchase Agreement (PPA) with Tata Power. The verification team has reviewed the commissioning certificates/3/ and purchase agreements/4/ for confirmation of the same

The verification team determines the conformity of the actual project activity and its operation with the validated project design document. EPIC has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the validated PDD are in place, and that the project participants have operated the CDM project activity as per the validated PDD. Thus the verification team has concluded that the project activity was implemented and operated as per validated PDD, and that all physical features of the project are in place.

The verification team, based on the site visit and document review, was able to conclude that the project activity has been commissioned and implemented as per the validated PDD. The start date of this monitoring period is 10/10/2013 which is in line with the UNFCCC project webpage/5/ considering the start date of the crediting period of the project activity as this is the first monitoring period of the crediting period.

The monitoring report for this monitoring period is in compliance with the monitoring plan of the validated PDD. The project activity was registered by applying the large scale methodology /6/ ACM0002 version 11.0 and the verification was carried out in accordance with the applied methodology.

It was confirmed during the site visit that the project activity during the current periodic verification is in accordance with the applicability criteria of the methodology. It is the responsibility of EPIC to express an independent GHG verification opinion on the GHG emissions reductions and on the calculation of GHG emission reductions from the project for this monitoring period based on the reported emission reduction in the monitoring Report.

EPIC's verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord, as well as those defined by the CDM Executive board. EPIC's approach was risk-based, drawing on an understanding of the risks associated with reported GHG emissions data and the controls in place to

mitigate these. The examination includes assessment of evidence relevant to the amounts and disclosures in relation to the project's GHG emission reductions for this monitoring period.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader/ Technical Expert	IR	A	Prabu Das	EPIC Sustainability (Central office, Bangalore)	X	X	X	X
2.	Verifier/ Technical Expert	EI	R	Narendra Kumar	EPIC Sustainability (Central office, Bangalore)	X	X	-	X

B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	R	Vijayaraghavan	EPIC Sustainability (Central office, Bangalore)

SECTION C. Application of materiality

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	No risk	Nil	Not applicable	Complete verification of all the values indicated in the emission reduction spreadsheet in documents such as JMR, invoices/obligation sheets.

C.2. Consideration of materiality in conducting the verification

In line with Guidelines for Application of materiality in verifications/7/, a reasonable level of assurance is defined for the verification of the project by complete verification of all the values indicated in the emission reduction spreadsheet in documents such as JMR, invoices/obligation sheets, Plant log records at the document review stage and onsite. There are no material errors, omissions or misstatements.

SECTION D. Means of verification**D.1. Desk review**

The verification was performed primarily based on the review of the monitoring report and the supporting documentation. This process included review of data and information presented to verify their completeness and review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the QA/QC procedures, and an evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of emission reduction.

The first MR/8/ version 1.0 submitted by the project participant and additional background documents related to the emission reductions are reviewed as an initial step of the verification process. The subsequent step involved the identification of corrective action requests and clarification requests (CAR and CR) which are presented in Appendix 4 of this report. A complete list of all documents and records reviewed is as attached in Appendix 3 of this report.

D.2. On-site inspection

Duration of on-site inspection: 08/10/2015 to 09/10/2015				
No.	Activity performed on-site	Site location	Date	Team member
1.	<ul style="list-style-type: none"> Physical visit of water intake, turbine & generator and governor & Excitation control panel Checked installation status of the project equipments Verified the name plate details of turbine & generator Interview with the operation in-charge regarding operational procedure, any change in the project equipments, major incidents during the monitoring period etc. 	Water intake, Turbine & generator	08/10/2015	Prabu Das & Narendra Kumar
2	The following has been checked in the control room: <ul style="list-style-type: none"> Line diagram Plant operational control procedures Gross energy meter & LT side auxiliary meter details Log recording procedures 	Control room	08/10/2015	Prabu Das & Narendra Kumar
3	Checked the details of the HT side auxiliary energy meters.	Auxiliary energy meters	08/10/2015	Prabu Das & Narendra Kumar
4	Checked the details of the Transformers	Power House switchyard	08/10/2015	Prabu Das & Narendra Kumar
5	The following activates are performed: <ul style="list-style-type: none"> Verification plant log records, JMR, invoices/ obligation sheets, calibration records, plant shutdown details etc. Interview with the plant personnel regarding monitoring, maintenance, QA/QC procedures, data consistency etc. 	Site Office	09/10/2015	Prabu Das & Narendra Kumar
6	Checked details of the main meter, check meter & standby meter Interview with the APTRANSCO personal for the metering procedure, data recording frequency, calibration frequency etc.	Bhadrachalam 132/33kV substation	09/10/2015	Prabu Das & Narendra Kumar

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	M	Subba Rao	SLS Power	08/10/2015 & 09/10/2015	<ul style="list-style-type: none"> - General aspects of the project - Implementation of monitoring plan - Changes since validation / previous verification - Remaining issues from validation/previous verification - Quality management system - Monitoring data management - Data analysis 	Prabu Das & Narendra Kumar
2	K	Janardhana Rao	SLS Power	08/10/2015 & 09/10/2015		Prabu Das & Narendra Kumar
3	CH.A.V	Sukesh	SLS Power	08/10/2015		Prabu Das & Narendra Kumar
					<ul style="list-style-type: none"> -Data Collection & Recording -Data uncertainty and residual risks 	

D.4. Sampling approach

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No sampling is used as the verification team has visited all the WTGs along with the substations. The verification team has reviewed all the documents like invoices/obligation sheets, JMRs etc.

D.5. Clarification requests, corrective action requests and forward action requests raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	-	1	-
Compliance of the project implementation with the registered PDD	-	-	-
Post-registration changes	-	-	-
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline	-	-	-
Compliance of monitoring activities with the registered monitoring plan	2	3	-
Compliance with the calibration frequency requirements for measuring instruments	-	1	-
Assessment of data and calculation of emission reductions or net removals	-	2	-
Others (please specify)	-	-	-
Total	2	7	0

SECTION E. Verification findings**E.1. Compliance of the monitoring report with the monitoring report form**

Means of verification	The verification team has determined whether the monitoring report was completed using the valid version of the applicable monitoring report form. The verification team has checked whether all the sections of the monitoring report follows the guidelines provided in the template itself.
Findings	CAR-01 is raised in this regard
Conclusion	PP has used the version 5.1 of the MR template/12/ which is current and active one. The monitoring report has been prepared as per the instructions provided in the template. EPIC has made the version 1.0 of the monitoring report/8/ covering the monitoring period from 10/10/2013 to 31/03/2015 publicly available through its

	dedicated interface on the UNFCCC CDM website/5/ before undertaking the site visit for the verification on 08/10/2015 and 09/10/2015. The verification team has concluded that the monitoring report was completed using the valid version of the applicable monitoring report form and is followed the guidelines given in the template itself.
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E.2. Remaining forward action requests from validation and/or previous verification

The verification team has reviewed the validation report and observed that there the following forward Action Request (FAR) was raised during validation.

The auxiliary consumption transmission losses will be monitored periodically and in case the combined auxiliary consumption and transmission losses is less than 3%, the financial additionality of the project should be revisited.'

PP was asked to justify the same for this monitoring period. From the explanation from PP and review of the monitoring report, it is confirmed that the net electricity generation achieved during the monitoring period itself, is about 65% less than the net electricity generation estimated in the registered PDD. Though it is noticed from ER calculation sheet that, the auxiliary consumption in the monitoring period is about 3.58% of gross generation, the net generation achieved is 63.4% less than the generation estimated in the PDD. Hence, the additionality is still valid.

E.3. Compliance of the project implementation with the registered project design document

Means of verification	The verification team determined the conformity of the actual project activity and its operation with the validated project design document. EPIC has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the validated PDD/2/ are in place, and that the project participants have operated the CDM project activity as per the validated PDD/2/ .
Findings	No CAR/CL is raised in this section
Conclusion	The verification team has reviewed the commissioning certificates/3/ and power purchase agreements/4/. The verification team has observed at the site that all physical features of the power plant equipments along with the substations correctly match with the validated PDD. Thus the verification team has concluded that the project activity was implemented and operated as per validated PDD. The specification of the main and check meters such as location, connectivity, substation, voltage levels and accuracy are matching with that mentioned in the validated PDD and previous monitoring reports. The verification team, based on the site visit and document review, was able to conclude that the project activity has been commissioned and implemented as per the validated PDD and that all physical features of the project are in place

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

There is no temporary deviation for this monitoring period from the registered PDD.

E.4.2. Corrections

There are no corrections in this monitoring period.

E.4.3. Changes to the start date of the crediting period

Since the project implementation got delayed, the start date of the crediting period is changed from 11/10/2011 to 10/10/2013. This revision of start date is validated by DOE and it is accepted by EB on 20 Aug 2014 (PRC Ref No. 4818-001). The UNFCCC project page has been verified and this is found to be correct.

E.4.4. Inclusion of a monitoring plan to a registered project activity

Not applicable

E.4.5. Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline

There are no permanent changes from registered monitoring plan, monitoring methodology or standardized baseline.

E.4.6. Changes to the project design of a registered project activity

There is no change in project design

E.4.7. Types of changes specific to afforestation and reforestation project activities

Not applicable as the project does not involve afforestation and reforestation activity

E.5. Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline

Means of verification	The verification team checked compliance of project monitoring plan with the applied methodology/6/ (ACM0002 version 11.0) including applicable tools.
Findings	No CARs/CLs raised in this section
Conclusion	The verification team was able to confirm that the monitoring plan contained in the registered PDD is in accordance with the approved methodology applied by the project activity, i.e. ACM0002, version 11 and its applicable tools.

E.6. Compliance of monitoring activities with the registered monitoring plan**E.6.1. Data and parameters fixed ex ante or at renewal of crediting period**

Means of verification	The only parameter fixed ex-ante is 'CO ₂ emission factor for the regional grid system' (EF _{grid,CM,y}). This parameter is calculated based on the CEA data base which is publically available. The source data are rechecked with the CEA database. The calculation provided in the PDD is validated by the validating agency and the same is rechecked.
Findings	No CARs/CLs raised in this section
Conclusion	EF _{grid,CM,y} is the emission factor of the regional grid system (ie, Southern Grid) to which the project is connected, and was determined and validated ex-ante as 0.89 tCO ₂ /MWh and will not be updated during the first crediting period. The value is correctly applied in the emission reduction calculation.

E.6.2. Data and parameters monitored

Means of verification	The verification team has determined whether the registered monitoring plan has been properly implemented and followed by the PP that the monitoring has been carried out in accordance with the registered monitoring plan; and determined whether all parameters including project emission parameters, baseline emission parameters and leakage parameters used for emission reduction calculation stated in the registered monitoring plan are monitored or used appropriately as per the registered PDD.
Findings	CL-01, CL-02, CAR-02, CAR-03 & CAR-4 are raised in this sections
Conclusion	According to the monitoring plan of the registered PDD, there are one parameter to be monitored: 1) Quantity of net electricity supplied by the project plant/unit to the grid in year y (EG _{facility, y}) is monitored through energy meter installed at the substation. The import and export readings are taken on monthly basis and the net electricity is calculated and provided in the Joint meter reading (JMR) statement. So, the EG _{facility, y} is directly taken from the Joint Meter Reading. These readings are also the source for the billing. Verification team checked all monthly JMR statement/9/ and found that all the values considered for this parameter is correct. Three energy meters are installed namely main meter, check meter and standby meter. It is observed through verification of JMRs that during the period of August 2014 and September 2014 the energy meters were changed. The details of the energy meters installed at substation and calibration details are given under section E.7. As

	<p>mentioned in the PDD, the $EG_{\text{facility}, y}$ can be cross checked based on the difference between gross energy generation (EG_{Gross}) and auxiliary consumption (EG_{aux}) measured at site. The gross energy generation is 62,310.88 MWh and auxiliary consumption is 1605.86 MWh. Hence, the net energy calculated from these readings is 60,705.02 MWh. The value applied for $EG_{\text{facility}, y}$ based on the JMR reading is 54.116 MWh which is lesser than the net electricity calculated from gross generation and auxiliary consumption. This is mainly due to the transmission loss, and transformer loss. This value is also crosschecked with the monthly consolidated values from daily obligation sheets/invoice for export and DISCOM invoices for import. Hence the value applied for the $EG_{\text{facility}, y}$ is correct and appropriate.</p> <p>2) Quantity of electricity produced by the project plant/unit from the grid in year y (EG_{Gross}), is monitored through energy meter installed at the plant. The meter readings are noted down every month in the plant logbook/11/ and the same is verified during site visit and found that the gross energy generation values provided in the ER calculation sheet is correct. This parameter is not used for calculation of emission reduction and just used to crosscheck the $EG_{\text{facility}, y}$ value.</p> <p>3) Total auxiliary electricity used for internal loads in year y (EG_{aux}) is monitored through the auxiliary energy meter installed at the site. The meter readings are noted down every month in the plant logbook/11/ and the same is verified during site visit and found that the auxiliary details provided in the ER calculation sheet is correct. This parameter is not used for calculation of emission reduction, but just used to crosscheck the $EG_{\text{facility}, y}$ value..</p> <p>4) CO_2 emission factor for diesel ($EF_{CO_2, y}$) is taken from the IPCC Guidelines on National GHG Inventories, 2006/13/ which is verified and found that the value considered is correct at the 95% confidence interval.</p> <p>5) Average net calorific value of diesel in year y (NCV_y) is taken from the IPCC Guidelines on National GHG Inventories, 2006/13/ which is verified and found that the value considered is correct at the 95% confidence interval.</p> <p>6) Quantity of diesel combusted in the project activity during year y ($FC_{\text{diesel}, y}$) is monitored as and when Diesel generator is used based on the level difference in rural gauge. The same is reported monthly in the plant log book/11/. The diesel consumption log book is verified during site visit and found that the value considered for this parameter is correct. Since the diesel consumption is monitored in volume basis, the same is converted to mass unit by considering the density of fuel. The density of diesel is considered based on the details provided by Society of Indian Automobile/15/ which verified and found to be correct.</p>
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E.6.3. Implementation of sampling plan

Means of verification	No sampling involved in monitoring of any parameter.
Findings	-
Conclusion	-

E.7. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	The verification team determined whether the calibration of the measuring equipment that has an impact on the claimed emission reductions is conducted by the PP at a frequency specified in the registered monitoring plan. The calibration records were verified to check the frequency of calibration of the measuring instruments.		
Findings	CAR-05 is raised in this section.		
Conclusion	Calibration details substation meters are given below:		
		Main meter	Check meter
	Meter number (old)	AP911119	AP911120
	Accuracy class (old)	0.2S	0.2S
			Standby meter
			AP915962
			0.2S

	Commissioning date	07/12/2013	07/12/2013	07/12/2013
	Calibration validity	06/12/2014	06/12/2014	06/12/2014
	Meter number (new)	APZ00001	APZ00002	APZ00003
	Accuracy class (new)	0.2S	0.2S	0.2S
	Meter change date	30/08/2014	30/08/2014	29/09/2014
	Calibration validity	29/08/2015	29/08/2015	28/09/2015
	Next Calibration date	13/09/2014	13/09/2014	-
	Calibration validity	12/09/2015	12/09/2015	
<p>The energy meters installed are tested at the time of commissioning of the project as well as at the time of meter replacement by the electricity board officials. Meter replacement records have been verified from the review of log book and interview with the PP.</p> <p>The present energy meter was checked during site visit. All the calibration details were verified from calibration certificate/10/. From the above calibration date, the verification team confirmed that the calibration of the project energy meters are done within one year which is in line with the frequency requirement of registered PDD.</p> <p>It is also noted that the gross energy meter and auxiliary energy meter are not calibrated in the monitoring period. However, readings taken from these meters are not used for the emission reduction calculation but just used for the crosschecking the $EG_{\text{facility}, y}$ value. Hence, it is accepted by verification team as EG_{Gross} and EG_{aux} are not directly used in emission reduction</p>				

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan.
Findings	No CARs/CLs raised in this section
Conclusion	<p>Baseline emissions is the product of the baseline emission factor (EF_y) times the net electricity supplied by the project activity to the grid ($EG_{\text{facility}, y}$).</p> $BE_y = EG_{\text{facility}, y} \times EF_y$ <p>EF_y is emission factor of the grid, which was calculated ex-ante and will not be updated during the first crediting period. EF_y of the proposed project in the registered PDD is 0.89 tCO₂/MWh, which has been verified to be correct based on the availability of grid data. $EG_{\text{facility}, y}$ is the net electricity generation supplied to the grid, which is measured at the tri-vector meter installed at the substation. The $EG_{\text{facility}, y}$ readings mentioned in the ER sheet is cross-checked through the JMR readings/9/ by the verification team.</p> <p> $EG_{\text{facility}, y} = 54,116 \text{ MWh}$ $EF_y = 0.89 \text{ tCO}_2\text{e/MWh}$ $BE_y = 48,163 \text{ tCO}_2\text{e}$ </p> <p>The verification team has crosschecked the ER calculation sheet/16/ and found that</p>

	the baseline emission calculation is correct and in accordance with the formulas & equations provided in the registered PDD. Hence the baseline emission value calculated in ER sheet and reported in the monitoring report is correct.
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E.8.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan
Findings	CAR-06 is raised in this section.
Conclusion	<p>Project emissions are calculated from diesel consumption ($FC_{\text{diesel}, y}$), net calorific value of Diesel (NCV_J) and CO₂ emission factor of Diesel ($EF_{CO_2, y}$) as follows: $PE_y = FC_{\text{diesel}, y} \times \text{density} \times NCV_J \times EF_{CO_2, y}$</p> <p>$FC_y$ is monitored through ruler gauge as described in above sections and the NCV_J & $EF_{CO_2, y}$ values are taken from IPCC, 2006. The plant diesel consumption log records are verified to confirm the value of diesel consumption and IPCC is verified to confirm the value of NCV & emission factor of diesel. The density of diesel is considered as 0.82 kg/l as per Society of Indian Automobile/15/ $FC_{\text{diesel}, y} = 0.204 \text{ kl}$ Density = 0.82 kg/l $NCV_J = 43.3 \text{ TJ/Gg}$ $EF_{CO_2, y} = 74.8 \text{ tCO}_2/\text{TJ}$ $PE_y = 1 \text{ tCO}_2\text{e}$</p> <p>The verification team has crosschecked the ER calculation sheet/16/ and found that the project emission calculation is correct and in accordance with the formulas & equations provided in the registered PDD. Hence the project emission value calculated in ER sheet and reported in the monitoring report is correct.</p>

E.8.3. Calculation of leakage GHG emissions

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan.
Findings	No CARs/CLs raised in this section
Conclusion	The leakage emissions are regarded as zero according to the applied methodology.

E.8.4. Summary of calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan.
Findings	No CARs/CLs raised in this section
Conclusion	<p>Emission reductions in this monitoring period are:</p> $ER_y = BE_y - PE_y - L_y$ $= 48,163 - 0 = 48,162 \text{ tCO}_2\text{e}$ <p>The verification team has crosschecked the ER calculation sheet/16/ and found that the emission reduction calculation is correct and in accordance with the formulas & equations provided in the registered PDD. Hence the emission reduction value calculated in ER sheet and reported in the monitoring report is correct</p>

E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	The verification team has determined the CER achieved during this monitoring period with the estimated value and reason for increase if any.
Findings	No CARs/CLs raised in this section
Conclusion	The actual CER achieved is less than the estimated one which is due to lower PLF.

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	The verification team has determined the CER achieved during this monitoring period with the estimated value and reason for increase if any.
Findings	CAR-07 raised in this section
Conclusion	The actual CER achieved is less than the estimated one which is due to lower PLF.

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	The verification team has determined the CER achieved during first commitment period and second commitment period
Findings	No CARs/CLs raised in this section
Conclusion	ER achieved up to 31st Dec 2012 = Not applicable ER achieved from 1st Jan 2013 = 48,162 tCO ₂ e.

SECTION F. Internal quality control

After the completion of assessment by the verification team all the relevant documentation is submitted to a qualified, Independent Technical Reviewer as part of EPIC's Internal quality Control system. A Technical Reviewer team is appointed to review the draft final validation report (Draft FVR). The comments made by the Technical Reviewer team are taken into consideration and incorporated in the final FVR. The technical reviewer assesses whether all the reporting requirements have been fulfilled and whether all the issues raised were closed satisfactorily by the validation team with appropriate justification. The technical review process can also raise issues in this regard which is resolved further by the validation team to the satisfaction of the Technical Reviewer. The Technical Reviewer either accepts or rejects made by the validation team. The final report (after resolutions of all findings) is then submitted to the Head – Operations for review and approval.

SECTION G. Verification opinion

EPIC Sustainability Services Private Limited (EPIC) has been contracted by M/s SLS Power Corporation Limited to undertake the first periodic independent verification of the registered CDM project activity titled "24 MW Dummagudem Hydel project by SLS Power Corporation Limited" (UNFCCC reference number: 4818). The objectives of this verification are to verify and certify emission reductions reported for project activity for the monitoring period of 10/10/2013 to 31/03/2015 (first and last day included); and to verify that the data reported are complete and transparent.

The verification team determines the conformity of the actual project activity and its operation with the validated project design document. EPIC has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the validated PDD are in place, and that the project participants have operated the CDM project activity as per the validated PDD/2/. Thus the verification team has concluded that the project activity was implemented and operated as per validated PDD, and that all physical features of the project are in place.

The verification team, based on the site visit and document review, was able to conclude that the project activity has been commissioned and implemented as per the validated PDD. The start date

of this monitoring period is 10/10/2013 which is in line with the UNFCCC project webpage considering the start date of the crediting period.

The monitoring report for this monitoring period is in compliance with the monitoring plan of the validated PDD/2/. The verification team was able to confirm that the monitoring plan contained in the registered PDD is in accordance with the approved methodology applied by the project activity, i.e. ACM0002 and its applicable tools. It was confirmed during the site visit that the project activity during the current periodic verification is in accordance with the applicability criteria of the methodology.

The management of project participants is responsible for the preparation and reporting of GHG emissions data, and the reported GHG emission reduction on the basis set out within the project monitoring plan. The development and maintenance of records and reporting procedures in accordance with the monitoring plan, including the calculation and determination of GHG emission reduction from the project is the responsibility of the management of the project. It is the responsibility of EPIC to express an independent GHG verification opinion on the GHG emissions reductions and on the calculation of GHG emission reductions from the project for this monitoring period based on the reported emission reduction in the monitoring Report.

EPIC's verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord, as well as those defined by the CDM Executive board. EPIC's approach was risk-based, drawing on an understanding of the risks associated with reported GHG emissions data and the controls in place to mitigate these. The examination includes assessment of evidence relevant to the amounts and disclosures in relation to the project's GHG emission reductions for this monitoring period.

The verification team has planned and performed the work to obtain the information and explanations that is considered necessary to provide sufficient evidence for it to give reasonable assurance that the amount of calculated GHG emission reductions for this monitoring period were fairly stated. The verification team has verified that the information included in the revised monitoring report is correct and that the emission reduction achieved has been determined correctly. Based on the information seen and evaluated, the verification team confirms the following:

Project title:	24 MW Dummagudem Hydel project by SLS Power Corporation Limited
UNFCCC ref no:	4818
Crediting period:	10/10/2013 to 09/10/2023
PDD	Version 05, dated 15/12/2013
Monitoring report	Version 02.1, dated 08/02/2016
Methodology used for verification:	ACM0002 ver. 11
Applicable monitoring period:	10/10/2013 to 31/03/2015
Emissions reductions verified:	48,162 tCO ₂ e

SECTION H. Certification statement

As above

Abbreviations

Abbreviations	Full texts
APTRANSCO	Andhra Pradesh Transmission Company
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CDM PCP	Clean Development Mechanism Project Cycle Procedure
CDM PS	Clean Development Mechanism Project Standard
CDM VVS	CDM Validation and Verification Standard
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CP	Commitment Period
DOE	Designated Operational Entity EB Executive Board
EF	Emission factor
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
HEPP	Hydro Electric Power Plant
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
MW	Mega Watt
MWh	Mega Watt hour
PDD	Project Design Document
PP	Project Participant
PPA	Power Purchase Agreement
UNFCCC	United Nations Framework Convention on Climate Change

Appendix 1. Competence of team members and technical reviewers

The following validation team has been assigned to carry out the verification of the project

Name	Mr. A. Prabu Das	Mr. R Narendra Kumar	Mr. R. Vijayaraghavan
Role	Lead Auditor	Team member	Technical reviewer
Competence in relevant Technical Area	1.2	1.2	1.2
Responsibility	Doc review, onsite, DVR preparation, DVR resolution, FVR preparation	Doc review, onsite, FVR preparation	Technical Review

Mr. A Prabu Das, holds a M.Tech Degree in Energy Conservation and Management and B. Tech Degree in Petro-chemical Technology. He is a certified Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has around 8 years of work experience in Design of biomass Power plants, preparing Techno Economic Feasibility Reports (TEFR), carrying out energy audits, of which last six years have been in CDM consultancy and validation services. He has undergone extensive training on CDM validation and verification and is a qualified lead auditor for Sectoral Scope 1 under Technical Area "TA 1.2 Renewables" in accordance with procedures of EPIC Sustainability Services Pvt. Ltd. He is also an ISO 26000 lead auditor certified by Professional Evaluation and Certification Board (PECB).

Mr. R. Narendra Kumar, holds B.Tech in Energy and Environmental Engineering. He is certified as Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has 7 years of working experience in energy sector including validation / verification of fifty CDM and VCS/GS projects and has undergone extensive training on CDM validation and verification and has been qualified as Lead Auditor with Sectoral Scope 1. He is also an ISO 14001 lead auditor.

Mr. R. Vijayaraghavan, holds BE in Mechanical Engineering, M.Tech in Energy Conservation and Management and MBA in Technology Management. He is certified as Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has 10 years of working experience in energy sector including validation / verification of fifty CDM and VCS/GS projects and has undergone extensive training on CDM validation and verification and has been qualified as Lead Auditor with Sectoral Scope 1 and 13. He is also an ISO 26000 lead auditor certified by Professional Evaluation and Certification Board (PECB).

Appendix 2. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	UNFCCC	Validation and verification standard version 9.0 https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20150225165215954/accr_stan02.pdf	/1/	Publically available
2	UNFCCC	PRC approved PDD, validation report, previous monitoring reports, previous verification reports https://cdm.unfccc.int/Projects/DB/RWTUV1305635486.86/view	/2/	Publically available
3	PP	Commissioning certificates	/3/	PP
4	PP	Power Purchase agreements	/4/	PP
5	PP	UNFCCC webpage –indicating start date of this monitoring period	/5/	Publically available
6	UNFCCC	ACM0002, version 11	/6/	Publically available
7	UNFCCC	Guidelines for Application of materiality in verifications version 2.0	/7/	Publically available
8	UNFCCC PP	Webhosted monitoring report version 1.0 Revised monitoring report, version 2.0 Revised monitoring report, version 2.1	/8/	PP
9	PP	Monthly Joint metering reading	/9/	PP
10	PP	Calibration certificates	/10/	PP
11	PP	Plant records: -Auxiliary consumption -Diesel consumption -Major Incidents -Plant outages	/11/	PP
12	UNFCCC	Template: Monitoring Report Form, version 05.1	/12/	Publically available
13	IPCC	IPCC Guidelines on National GHG Inventories, 2006	/13/	Publically available
14	PP	Electricity sale invoices/Daily obligation sheets	/14/	PP
15	Society of Indian Automobile	Society of Indian Automobile http://www.siamindia.com/scripts/Diesel.aspx	/15/	Publically available
16	PP	Emission reduction calculation sheet	/16/	PP

Appendix 3. Clarification requests, corrective action requests and forward action requests

Table 1. Remaining FAR from validation and/or previous verification

FAR ID	01	Section no.	E.2	Date: 28/10/2015
Description of FAR				
As per the validation report, the following FAR has been raised				
<i>'The auxiliary consumption transmission losses will be monitored periodically and in case the combined auxiliary consumption and transmission losses is less than 3%, the financial additionality of the project should be revisited.'</i>				
Please justify how this point has been justified during this monitoring period.				
Project participant response				Date: 12/11/2015
<i>The project has not generated as expected and predicted in the registered PDD. The generation infact it is very very low and is just 35% of the estimated generation. Hence, the revisiting additionality is not required.</i>				
Documentation provided by project participant				
1. The Monitoring Report 2. JMRs				
DOE assessment				Date: 29/12/2015
As verified from the monitoring report and ER calculation sheet, the net electricity generation achieved during the monitoring period itself, is about 65% less than the net electricity generation estimated in the registered PDD. It is also noticed from ER calculation sheet that, the auxiliary consumption in the monitoring period is about 2.97% of gross generation. Hence, the additionality is still valid. FAR-01 from the validation is closed for this verification.				

Table 2. CL from this verification

CL ID	01	Section no.	E.6.2	Date: 28/10/2015
Description of CL				
Though the power plant was Synchronized with grid on 7 th December 2013, the generation during the period from 07/12/2013 to 25/01/2014 is not considered for the ER calculation. Clarify				
Project participant response				Date: 12/11/2015
<i>The project had applied for change of crediting period due to delayed commissioning. This request was accepted by UNFCCC by PRC Ref No. 4818-001. The project thus has considered this monitoring period from 10 October 2013 to 31 March 2015. The period of December 2013 and January 2014 was the project synchronization period to the grid. During this project the Energy pumped to the grid was not billed or recorded. Thus these 2 months generation has not been considered only for the period starting with the JMR records.</i>				
Documentation provided by project participant				
<i>JMRs from the date of signing and recording.</i>				
DOE assessment				Date: 29/12/2015
As per justification of PP, during the period between 07/12/2013 to 25/01/2014, the plant was under trial run. Due to this reason, no JMR was raised and no billing was done during the period. Hence, not considering the period for the emission reduction calculation seems to be appropriate and conservative. CL-1 is closed				

CL ID	02	Section no.	E.6.2	Date: 28/10/2015
Description of CL				
A new parameter- 'Quantity of electricity imported by the project plant/unit from the grid in year y' (EG _{facility, import, y}) is included in the monitoring period which is not a part of monitoring parameter as per the registered PDD. Clarify.				
Project participant response				Date: 12/11/2015
<i>The parameter is removed now.</i>				
Documentation provided by project participant				
<i>The revised MR</i>				
DOE assessment				Date: 29/12/2015
PP has now removed the EG _{facility, import, y} parameter from the MR and made consistent with the parameters in PDD. CL-02 is closed				

Table 3. CAR from this verification

CAR ID	01	Section no.	E.1	Date: 28/10/2015
Description of CAR				
The manufacture details of the project equipments are not provided in the section B.1 of the Monitoring report				
Project participant response				Date: 12/11/2015
<i>The same has been included in the MR in section B.1.</i>				
Documentation provided by project participant				
<i>The revised MR.</i>				
DOE assessment				Date: 29/12/2015
The manufacturer details of the project equipment is now included in the section B.1 of the monitoring report now. These are verified and found to be correct.				
CAR-01 is closed				

CAR ID	02	Section no.	E.6.2	Date: 28/10/2015
Description of CAR				
During site visit it is observed that the invoices (obligation certificate) is raised based on the export data. Import will be billed by DISCOM to PP separately. The same is not explained in the monitoring report.				
Project participant response				Date: 12/11/2015
<i>The project is selling the power to TATA Power, which based on the total export power. The DISCOM charges for the import energy from the grid. So, they raise the invoice on this energy. The same has been included in the revised MR.</i>				
Documentation provided by project participant				
<i>Revised MR.</i>				
DOE assessment				Date: 29/12/2015
The details of the import & export billing is now mentioned in the revised MR.				
CAR-02 is closed.				

CAR ID	03	Section no.	E.6.2	Date: 28/10/2015
Description of CAR				
As observed from the plant records, the main & check energy meter at the substation are changed to new meter on 30/08/2014 and the standby meter was changed on 29/09/2014. However, the same is not explained in the monitoring report.				
Project participant response				Date: 12/11/2015
<i>The same information is included in the MR.</i>				
Documentation provided by project participant				
<i>Revised MR</i>				
DOE assessment				Date: 29/12/2015
The meter change details are now mentioned in the revised MR.				
CAR-03 is closed.				

CAR ID	04	Section no.	E.6.2	Date: 28/10/2015
Description of CAR				
As per the ER calculation sheet, the net electricity supplied is calculated from export, import & auxiliary consumption. However, the import & export measured at substation meter itself is net which already accounts auxiliary consumption. Hence, again considering auxiliary consumption is double counting.				
Project participant response				Date: 12/11/2015
<i>The auxiliary consumption is now removed from the calculation of net electricity. The net electricity is now calculated based on export and import only. The MR & ER sheet is updated with the revised calculation.</i>				
Documentation provided by project participant				
<i>Revised MR</i>				
<i>Revised ER calculation sheet</i>				
DOE assessment				Date: 29/12/2015
PP has now calculated net electricity as export minus import which correct. This results to the emission reduction of 48,162 tCO ₂ .				
CAR-04 is closed				

CAR ID	05	Section no.	E.7	Date: 28/10/2015
Description of CAR				
The monitoring report indicates only the latest calibration information, but the calibration details since commissioning of the plant covering the monitoring period is not mentioned and supported by documents.				
Project participant response				Date: 11/12/2015
<i>All the calibration details are included. The calibration is done Annually from commissioning period, hence from that period</i>				
Documentation provided by project participant				
<i>Revised MR.</i>				
DOE assessment				Date: 29/12/2015
All the calibration details from the date of commissioning is now included in the revised monitoring report. CAR-05 is closed				

CAR ID	06	Section no.	E.8.2	Date: 28/10/2015
Description of CAR				
In the ER calculation sheet, the density of diesel is considered as 13.12 kg/l in the project emission calculation, which is not correct.				
Project participant response				Date: 11/12/2015
<i>The density of the diesel used in the computation is 0.82 kg/l. The same has been used in the excel computations.</i>				
Documentation provided by project participant				
<i>Revised ER calculation sheet Revised Monitoring Report</i>				
DOE assessment				Date: 29/12/2015
The density of diesel is now changed to 0.82 kg/l which is correct. Hence the revising project emission and emission reductions are reported accordingly. CAR-06 is closed				

CAR ID	07	Section no.	E.8.5	Date: 28/10/2015
Description of CAR				
In the ER calculation sheet, the total days in the monitoring period is wrongly calculated as 537 days. So, the Emission Reductions estimation as per PDD for the current Monitoring Period is not correct				
Project participant response				Date: 11/12/2015
<i>The Monitoring Period is 10 Oct 2013 to 31 March 2015 which works out to be 538 days. The same is revised in the ER calculation sheet</i>				
Documentation provided by project participant				
<i>Revised ER calculation sheet.</i>				
DOE assessment				Date: 29/12/2015
The monitoring period days is now corrected to 538 days. CAR-07 is closed				

Table 4. FAR from this verification

FAR ID	xx	Section No.	NA	Date: NA
Description of FAR				
There is no FAR raised from this verification				
Project participant response				Date: NA
Documentation provided by project participant				
NA				
DOE assessment				Date: NA
NA				

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
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