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# VERIFICATION AND CERTIFICATION REPORT

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**International Bank for Reconstruction and  
Development (“IBRD”) acting as trustee of the  
Spanish Carbon Fund (SCF)**

**PoA: SGCC In-advance Distribution Transformer  
Replacement CDM Programme**

(UNFCCC Reference No.: 2896)

CPA-001, CPA-002, CPA-003 and CPA-004

Second Monitoring period: 01/12/2011 to 31/12/2013 (both days inclusive)

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**SGS Climate Change Programme**

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<b>Date of Issue:</b>	<b>Project Number:</b>
18-07-2014	CDM.VER1300 PoA MP2
<b>PoA Title:</b>	<b>UNFCCC Reference Number</b>
SGCC In-advance Distribution Transformer Replacement CDM Programme	2896
<b>CPAs included:</b>	<b>UNFCCC Reference Number</b>
SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-001	2896-0001
SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-002	2896-0002
SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-003	2896-0003
SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-004	2896-0004
<b>Organisation:</b>	<b>Client:</b>
SGS United Kingdom Limited	International Bank for Reconstruction and Development ("IBRD") acting as trustee of the Spanish Carbon Fund (SCF)
<b>Publication of Monitoring Report:</b>	
<b>Monitoring Period:</b>	01/12/2011 to 31/12/2013
First Monitoring Report Version and Date:	Version 01 dated 26/02/2014
Final Monitoring Report Version and Date:	Version 05 dated 02/07/2014
<b>Summary:</b>	
<p>SGS United Kingdom Ltd has performed the second periodic verification of the Programme of Activity (PoA) SGCC In-advance Distribution Transformer Replacement CDM Programme (UNFCCC. Ref. No.: 2896), registration date of 12/02/2011 and first crediting period from 12/02/2011 to 11/02/2018. Four CPAs are included in the PoA for this monitoring period.</p> <ul style="list-style-type: none"> <li>- SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-001, Ref. 2896-0001 included on 12/02/2011;</li> <li>- SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-002, Ref. 2896-0002 included on 28/05/2012;</li> <li>- SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-003 Ref. 2896-0003 included on 28/05/2012;</li> <li>- SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-004, Ref. 2896-0004 included on 28/05/2012</li> </ul> <p>The verification includes confirming the implementation of the PoA and the CPAs included in the PoA and the monitoring plan in the CPA-DDs and the application of the monitoring methodology as per the approved methodology for small-scale CDM project AMS.II.A.: "Supply Side Energy Efficiency Improvements – Transmission and Distribution" Version 10. A site visit was conducted to verify the data submitted in the monitoring report. SGS confirms the following has been reviewed:</p> <ul style="list-style-type: none"> <li>(a) The registered PoA-DD and CPA-DDs, including the monitoring plan and the corresponding validation report;</li> <li>(b) Monitoring report and corresponding ER calculation spreadsheet, previous verification report;</li> <li>(c) The applied monitoring methodology;</li> <li>(d) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board;</li> <li>(e) All information and references relevant to the project activity's resulting in emission reductions.</li> </ul> <p>SGCC In-advance Distribution Transformer Replacement CDM Programme is an efficiency programme of activities that is implemented by State Grid Corporation of China (SGCC) in the electricity transmission and distribution systems of 25 provinces in China controlled by SGCC.</p>	

<p>The goal of the PoA is to replace low efficiency in-service transformers which are Type 7 or Type 8 transformers with high efficiency newly purchased transformers, whose no-load losses are compliant with or lower than that of the same rated capacity Type 11 transformers to reduce the electricity losses caused by no-load losses of transformers during power supply by the grids, in order to reduce CO<sub>2</sub> emissions.</p> <p>SGS confirms that the project is implemented in accordance with the validated and registered PoA-DD and CPA-DDs. The monitoring system is in place and the emission reductions are calculated without material misstatements. Our opinion is related to the projected GHG emissions, the resulting GHG emission reductions reported, the valid and registered project baseline and monitoring and its associated documents. Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 74,894 tCO<sub>2</sub>e emission reductions during period 01/12/2011 up to 31/12/2013.</p>		
<b>Subject:</b>		
CDM Verification		
<b>Verification Team:</b>		
Michael WU Shimin – Team Leader / Lead Assessor/Local Assessor Sarah Chan Wanlan – Assessor Vikas Bankar – Technical Area Expert (TA 2.1) Sergio Alvarado – Statistical Expert		<input checked="" type="checkbox"/> No Distribution (without permission from the Client or responsible organisational unit)
<b>Technical Review:</b> Date: 18/07/2014 Name: Linda Hu		
<b>Authorised Signatory:</b>		<input type="checkbox"/> Limited Distribution
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## Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CERs	Certified Emission Reductions
CL	Clarification Request
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
COP/MOP	Conference of the Parties/Meeting of the Parties
CPA	Component Project Activity
CPA-DD	Component Project Activity Design Document
DNA	Designated National Authority
EF	Emission Factor
ERs	Emission Reductions
GHG	Green House Gas(es)
FAR	Forward Action Request
IBRD	International Bank for Reconstruction and Development
LL	Load Losses
MIS	Management Information System
MP	Monitoring Plan
MR	Monitoring Report
NLL	No-Load Losses
PoA	Programme of Activities
PoA-DD	Programme of Activities Design Document
PSL	Power Supply Reliability Rate
QA/QC	Quality Assurance/Quality Control
SCF	Spanish Carbon Fund
SGCC	State Grid Corporation of China
SGCC DT PoA	SGCC In-advance Distribution Transformer Replacement CDM Programme
SGS	SGS United Kingdom Ltd
TA	Technical Area
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standards

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## 1. Introduction

### 1.1 Objective

SGS United Kingdom Ltd has been contracted to perform an independent verification of its PoA “SGCC In-advance Distribution Transformer Replacement CDM Programme”. CDM projects and Programme of Activity must undergo periodic audits and verification of emission reductions as the basis for issuance of Certified Emission Reductions (CERs).

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The emissions report conforms with the requirements of the monitoring plan in the registered PoA DD and CPA-DDs;
- The data reported are complete and transparent.

### 1.2 Scope

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 and registered PoA-DD and CPA-DDs and the monitoring report. The project is assessed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

SGS has, based on the recommendations in the Validation and Verification Standard, employed a risk-based approach in the verification, focusing on the identification of significant reporting risks and the reliability of project monitoring.

Due professional care has been exercised and ethical conduct has been followed by the assessment team during the verification process. The verification report is a fair presentation of the verification activity.

The verification is not meant to provide any consulting towards the Client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

### 1.3 Project Activity and Period Covered

This engagement covers emissions and emission reductions from anthropogenic sources of greenhouse gases included within the project boundary of the following project and period.

Title of PoA:	SGCC In-advance Distribution Transformer Replacement CDM Programme
UNFCCC Registration Number:	2896
CPAs included:	SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-001 SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-002 SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-003 SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-004
Monitoring Period Covered in this Report:	01/12/2011 to 31/12/2013

Project Participants:	<p>Host Country (China): State Grid Corporation of China</p> <p>Annex I Country (Spain): International Bank for Reconstruction and Development (“IBRD”) acting as trustee of the Spanish Carbon Fund (SCF) ; Kingdom of Spain - Ministry of Agriculture, Food and Environment and Ministry of Economy and Competitiveness</p>
Location of the Project Activity:	<p>Heilongjiang Province, Jilin Province, Liaoning Province, Hebei Province, Shanxi Province, Beijing Municipality, Shanghai Municipality, Henan Province, Hubei Province, Hunan Province, Chongqing Municipality, Sichuan Province, Ningxia Hui Autonomous Region, Qinghai Province and Gansu Province</p>

SGCC In-advance Distribution Transformer Replacement CDM Programme is an efficiency programme of activities that is implemented by State Grid Corporation of China (SGCC) in the electricity transmission and distribution systems of 25 provinces in China controlled by SGCC. The goal of SGCC DT PoA is to replace low efficiency in-service transformers (baseline transformers) which are Type 7 or Type 8 transformers with high efficiency newly purchased transformers (project transformers) whose no-load losses are compliant with or lower than that of the same rated capacity Type 11 transformers to reduce the electricity losses caused by no-load losses of transformers during power supply by the grids, in order to reduce CO2 emissions.

## 2. Methodology

### 2.1 General Approach

SGS performs the verification work using a Periodic Verification Checklist prepared following the VVS. The Periodic Verification Checklist describes the verification approach and the sampling plan.

The checklist gives the assessment team a full understanding of:

- Activities associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant;
- Protocols used to estimate or measure GHG emissions from these sources;
- Collection and handling of data;
- Controls on the collection and handling of data;
- Means of verifying reported data; and
- Compilation of the monitoring report.

Using the Periodic Verification Checklist, SGS verified the implementation of the monitoring plan and the data presented in the Monitoring Report for the period in question. This involved a site visit and a desk review of the monitoring report. This verification report describes the findings of this assessment.

Only verification activities undertaken after the publication of the monitoring report on the UNFCCC CDM website were used as a basis for SGS to conclude our verification and submit a request for issuance of CERs to the Board.

### 2.2 Verification Team for this Assessment

A team of competency has been selected to perform the verification of the project.

Name	Role
Michael Wu Shimin	Team Leader / Lead Assessor/Local Assessor
Sarah Chan Wanlan	Assessor
Vikas Bankar	Technical Area Expert (TA 2.1)
Sergio Alvarado	Statistical Expert

### 2.3 Means of Verification

#### 2.3.1 Review of Documentation

The validated PoA DD, CPA-DDs, the monitoring report submitted by the client and additional background documents related to the project performance were reviewed. A complete list of all documents reviewed is attached in section 8 of this report.



### 2.3.2 Site Visits

As part of the verification, the following on-site inspections have been performed by members of the assessment team.

<b>Location:</b> Shenyang City, Liaoning Province, China	
<b>Date:</b> 24-26/03/2014	
<b>Coverage:</b>	<b>Source of Information / Persons Interviewed</b>
1. Assessment of the implementation and operation of the project activity as per the registered PoA DD and CPA-DDs;	Lv Qiaozhen, State Grid Corporation of China.
2. Review of information flows for generating, aggregating and reporting the monitoring parameters;	Guo Xuejiang, State Grid International Development Co., Ltd.
3. Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the monitoring plan.	Wang Lihua, State Grid International Development Co., Ltd. North China International Power Economic & Trade Corporation
4. A cross-check of the samples between information provided in the monitoring report and ER calculation spreadsheet and data from other sources such as manufacturer test report, operation form and MIS system ;	Zhang Guangnan, State Grid International Development Co., Ltd. North China International Power Economic & Trade Corporation
5. Systematically verify and certify the correct implementation and operation of the record-keeping system.	Du Weichen, Liaoning Electric Power Company Ltd.
6. A random visual check of the project transformers in Shenyang City including name plates and observations of monitoring practices against the requirements of the CPA-DDs and the selected methodology;	Wang Yang, Liaoning Electric Power Company Ltd.
7. Review of calculations and assumptions made in determining the GHG data and emission reductions;	Li Zijun, the World Bank;
8. Identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.	Liu Yang, Easy Carbon Consultancy Co. Ltd.

<b>Location:</b> Shanghai City, China	
<b>Date:</b> 27-28/03/2014	
<b>Coverage:</b>	<b>Source of Information / Persons Interviewed</b>
1. Assessment of the implementation and operation of the project activity as per the registered PoA DD and CPA-DDs;	Li Zengbin, State Grid Corporation of China.
2. Review of information flows for generating, aggregating and reporting the monitoring parameters;	Wang Lihua, State Grid International Development Co., Ltd. North China International Power Economic & Trade Corporation
3. Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the monitoring plan.	Guo Xuejiang, State Grid International Development Co., Ltd.
4. A cross-check between information provided in the monitoring report and data from other sources such as manufacturer test report, operation form and MIS system ;	Zhang Guangnan, State Grid International Development Co., Ltd. North China International Power Economic & Trade Corporation
5. Systematically verify and certify the correct implementation and operation of the record-keeping system.	Zou Jian, Shanghai Municipal Electric Power Company;
6. A random visual check of the project transformers replaced in Shanghai City including name plates and observations of monitoring practices against the requirements of the CPA-DDs and the selected methodology;	Zhang Chi, Shanghai Municipal Electric Power Company;
7. Review of calculations and assumptions made in determining the GHG data and emission reductions;	Gu Bin, Shanghai Municipal Electric Power Company;
8. Identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.	Cao Zhengwen, State Grid Materials (Shanghai) Co., Ltd.
	Ying Zhiwei, Shanghai Municipal Electric Power Transaction Center;
	Zhao Yan, Shanghai Municipal Electric Power Transaction Center;
	Zhuang Sheng, Qingpu Power Supply Company;
	Wei Wei, Shanghai Municipal Electric Power Company;
	Huang Bei, Shibe Power Supply Company;
	Qiu Jianpin, State Grid Materials (Shanghai) Co., Ltd.
	Nie Pengchen, Pudong Power Supply Company;
	Xu Tianren, State Grid Materials (Shanghai) Co., Ltd.
	Li Zijun, the World Bank;
	Guan Yisong, Easy Carbon Consultancy Co. Ltd.
	Liu Yang, Easy Carbon Consultancy Co. Ltd.

## 2.4 Reporting of Findings

As an outcome of the verification process, the team can raise different types of findings.

In general, where insufficient or inaccurate information is available and clarification or new information is required the team shall raise a Clarification Request (CL) specifying what additional information is required.

Where a non-conformance arises the team shall raise a Corrective Action Request (CAR). A CAR is issued, where:

- I. Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- II. Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- III. Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
- IV. Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants

The verification process may be halted until this information has been made available to comply with the requirements of the CDM Executive Board. Failure to address a CL may result in a CAR. Information or clarifications provided as a result of a CL may also lead to a CAR.

A clarification request (CL) will be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. All CARs and CLs raised during verification shall be resolved prior to submitting a request for issuance.

Corrective Action Requests and Clarification Requests are raised in the Periodic Verification Checklist. The Project Developer is given the opportunity to “close” outstanding CARs and respond to CLs.

Forward Action Requests (FARs) may be raised during verification for actions where the monitoring and reporting require attention and/or adjustment for the next verification period, which are for the benefit of future projects and future verification activities. These have no impact upon the completion of the verification activity.

All CARs, CLs and FARs for this verification period are included in this report.

## 2.5 Internal Quality Control

Following the completion of the assessment process and a recommendation by the Assessment Team, all documentation will be forwarded to a Technical Review Team. The task of the Technical Review Team is to check that all procedures have been followed and all conclusions are justified. The Technical Reviewer will either accept or reject the recommendation made by the assessment team.

### Technical Review Team

Name	Role
Linda Hu	Technical Reviewer
Shivaji Chakraborty	Technical Area expert TA 2.1

### 3. Verification Findings

#### 3.1 Project Implementation

Based on the information available on UNFCCC website [http://cdm.unfccc.int/ProgrammeOfActivities/poa\\_db/5DEPL4CVSQZAU23JR9H6F8KOYGMW70/view](http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/5DEPL4CVSQZAU23JR9H6F8KOYGMW70/view), the PoA (UNFCCC Ref. No. 2896) was registered on 12/02/2011 with the crediting period from 12/02/2011 to 11/02/2018 (renewable) (/1/).

SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-001 Ref. 2896-0001 was included on 12/02/2011, with the crediting period from 12/02/2011 to 11/02/2021(Fixed, (/2/)).

SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-002 Ref. 2896-0002 was included on 28/05/2012, with the crediting period from 01/06/2012 – 31/05/2022 (Fixed, (/3/));

SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-003 Ref. 2896-0003 included on 28/05/2012, with the crediting period from 01/06/2012 – 31/05/2022 (Fixed, (/4/));

SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-004, Ref. 2896-0004 included on 28/05/2012, with the crediting period from 01/06/2012 – 31/05/2022 (Fixed, (/5/)).

This is the second periodic verification of the PoA covering the period from 01/12/2011 to 31/12/2013 (/6/). The starting date of the monitoring period is consistent with the end date of the first monitoring period. The end date of this monitoring period is within the crediting period.

The PoA was registered against the approved methodology for small-scale CDM project AMS.II.A.: “Supply Side Energy Efficiency Improvements - Transmission and Distribution” Version 10 (/20/). The following has been checked to verify the applicability of the methodology to the project activity.

Criteria in AMS-II.A. ver. 10	Justification/Explanation	Is the applicability condition satisfied?
This category comprises technologies or measures which reduce technical energy losses through improving the energy efficiency of an electricity transmission / distribution system resulting in electricity savings of up to 60 GWh per year,	The electricity savings of CPA-001 to CPA-004 are up to 60 GWh per year.	Yes
<p>This category does not include:</p> <p>(i) Measures that reduce technical losses solely by improving operations and/or maintenance practices. For example low-voltage conditions in the network, uneven distribution of loads, loose connections, etc.</p> <p>(ii) The introduction of capacitor banks and tap changing transformers for reducing losses in an electricity distribution; this is because technical</p>	<p>(i) The goal of SGCC DT PoA is to replace low efficiency in-service transformers (hereinafter referred to as baseline transformers) which are Type 7 or Type 8 transformers with high efficiency newly purchased transformers (hereinafter referred to as project transformers) whose no-load losses are compliant with or lower than that of the same rated capacity Type 11 transformers to reduce the electricity losses caused by no-load losses of transformers during power supply by the grids, in order to reduce CO2 emissions.</p>	Yes

loss reductions due to such measure cannot be determined using the simplified approaches defined in this methodology.	(ii) This is not the introduction of capacitor banks and tap changing transformers for reducing losses in an electricity distribution	
<p>The following conditions apply for use of this methodology in a project activity under a programme of activities:</p> <p>In case the project activity involves the replacement of equipment, and the leakage effect of the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented.</p>	The baseline transformers (scrapped transformers) will be transported to the storehouse for keeping and will be finally scrapped in line with relevant regulations. No use of the scrapped transformers in another activity.	Yes
Criteria in AMS.I.D ver. 16: In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	Each replacement unit in CPA-001 to CPA-004 does not exceed the limit of 15 MW	Yes

Following para 350 of VVS version 07.0 (/21/), the assessment team conducted the verification of the PoA and confirmed that:

(a): Four CPAs were included in the PoA for this monitoring period and were identified by the assessment team for verification in accordance with the method/procedure to be used for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA and determined in the CDM-PoA-DD. After checking information in the CPA-DDs, it was confirmed that the CPAs are in accordance with the PoA-DD (/8/) and Generic CPA-DD (/13/).

(b): There is just one version of the PoA during this monitoring period, therefore, this version of the PoA is taken into account in the sampling approach.

(c): The monitoring report was published on the UNFCCC CDM website and available through following link:  
[http://cdm.unfccc.int/PoAIssuance/mon\\_db/poamon540875007/edit?viewmode=1](http://cdm.unfccc.int/PoAIssuance/mon_db/poamon540875007/edit?viewmode=1)

(d): The correct implementation and operation of the record keeping system was systematically verified and certified.

As per the description in the PoA-DD, the PoA is implemented by SGCC in the electricity transmission and distribution systems of 25 provinces in China controlled by SGCC. The goal of the PoA is to replace low efficiency in-service transformers which are Type 7 or Type 8 transformers with high efficiency newly purchased transformers whose no-load losses are compliant with or lower than that of the same rated capacity Type 11 transformers to reduce the electricity losses caused by no-load losses of transformers during power supply by the grids, in order to reduce CO<sub>2</sub> emissions.

According to the registered PoA-DD and CPA-DDs (/9//10//11//12/), the MIS System will work as a record keeping system for each CPA under PoA. Electronic documents relevant to CPAs of PoA will be kept in the MIS System. SGCC is responsible to develop and manage the MIS System. An independent server has been bought by SGCC for the MIS System for weekly backup of data and information to avoid data loss in case of an emergency.

Other documents relevant to CPAs of PoA such as manufacturer test reports of transformers, scrapping agreement etc. will be kept by Subsidiaries' CDM Working Teams. All monitoring data and information, including original photographs, will be kept at least for two years after the end of the last crediting period or two years after the last issuance of CERs, whichever occurs later. SGCC will open accounts of different

levels in the MIS System according to the requirements of monitoring data management. By managing accounts, the MIS System can track every operation on a piece of data.

A formal procedure has been developed by SGCC to implement the CPAs (/27//28/). Before replacement, the photo of the name plate of the baseline transformer was taken and the related information such as location, serial number, type, capacity, manufacture date, manufacturer, the non-load loss and load loss from the test report (if available) or the national standard were collected and summarised in the MIS system. An operation form had to be issued for the replacement. The process of replacement and date of replacement were properly recorded by the operator and checked by the supervisor. After replacement, the photo of the name plate of the project transformer was taken and the related information such as location, serial number, type, capacity, manufacture date, manufacturer, the no-load loss and load loss from the test report were collected and summarised in the MIS system.

For each replacement, the test report of the baseline transformer (if available) and the project transformer and the operation form were properly kept and archived by Subsidiaries' CDM Working Team.

After replacement, each baseline transformer was labelled for scrapping. The independent personnel from third parties witnessed the scrapping process of each transformer and a scrapping summary for the scrapped transformer was reported on daily basis. Moreover, video was also taken during the scrapping process, and the video records for each scrapped transformers (/37/) are available for checking.

Through onsite visit and detailed checking of the MIS system, it was confirmed that the record keeping system for this operation and monitoring of the PoA was established. Relevant information of the baseline transformers and project transformers such as the capacity, no-load loss, load loss, manufacturing dates, manufacture and photos have been kept in the MIS system. The original records of the manufacture test reports, scrapping agreements, operation forms have been properly achieved by the Subsidiaries' CDM Working Teams. The accounts of different levels in the MIS system have also been checked by the assessment team during the site visit.

SGCC In-advance Distribution Transformer Replacement CDM Programme (PoA 2896) includes 4 CPAs from CPA-001 to CPA-004 (hereinafter referred to as CPA-001, CPA-002, CPA-003, and CPA-004). CPA-001 to CPA-004 are implemented in the electricity transmission and distribution system in China and respectively involves the replacement of 1,100, 8,662, 9,289 and 9,570 low efficiency in-service distribution transformers (Type S7 and S8 Transformers, as the baseline transformers) with the high efficiency transformers (whose no-load losses are compliant with or lower than that of the same rated capacity Type 11 transformers, as the project transformers).

According to the MR version 01, the following transformers have been replaced in this monitoring period:

CPAs	Geographical boundary	Baseline transformers		Project transformers	
		Quantity	Type	Quantity	Type
CAP-001	Liaoning Province	1,100	S7	769	S13, SH15
CAP-002	Heilongjiang Province, Jilin Province, Liaoning Province, Hebei Province, Shanxi Province, Beijing Municipality, Shanghai Municipality,	8,662	S7, S8	3,209	S11, S13, SCB10, SCBH15, SH15
CAP-003	Henan Province, Hubei Province, Hunan Province, Chongqing Municipality, Sichuan Province, Ningxia Hui Autonomous Region, Qinghai Province and Gansu Province.	9,289	S7, S8	6,378	S11, S13, SCB10, SCBH15, SH15
CAP-004		9,570	S7, S8	1,894	S11, S13, SCB10, SCBH15, SH15
Total	/	28,621	/	12,250	/



During the site visit, the data in the MIS have been checked by the assessment team. It is noticed that the reported number of replaced transformers covers the transformers replaced before year 2013 and the transformers replaced in year 2013 were not included in the calculation of emission reductions. **CL #1** was raised requesting PP to provide related clarification and justifications in the monitoring report. It is clarified by the PP that most of the replacement in year 2013 was conducted in the 4th quarter of 2013 and the replacement information was not entered into MIS system at the time that the monitoring report version 01 was completed. Therefore, PP decided to exclude the 10,053 transformers replaced in year 2013 (/34/) from the second monitoring period for conservativeness. The clarification for excluding the transformers in this monitoring period is considered by the assessment team to be reasonable and conservative. **CL #1 was closed.**

The relevant evidences of the transformer purchasing agreement (/24/), the scrapping agreement (/25/) and the witness reports (/26/) were checked by the assessment team. It is confirmed that the project has been implemented and operated in accordance with the PoA-DD and CPA-DDs.

During this monitoring period, the project has been operated as per the registered PoA-DD and CPA-DDs. No special event or situation, which may impact the applicability of the methodology, occurred in this monitoring period, which was confirmed by interviewing the host country PP and reviewing the information in the MIS system.

During the onsite visit, the related evidences such as the photos of the baseline and project transformers, manufacturer report of the transformers, the operation forms for the replacement for the sample transformers were checked against the information in the submitted emission reduction calculation sheet. Inconsistencies were observed between the submitted sheet and the data sources, such as the serial number and the manufacture date of the baseline transformer No. 10668, the date of the replacement of the transformer No. 10670, the serial number of the transformer 13293 and 605. Also, the original evidences for the sample transformers No. 12548 and 9959 were not provided during the site visit. **CAR #2** was raised for PP to correct this inconsistency and provide evidences for the remaining two transformers. After reviewing the corrected information in the MIS system, the photos of the transformers and the operation forms, it is concluded that the observed inconsistency has been addressed. The information in the ER spreadsheet version 02 (/7/) has been corrected as well. The original evidences of transformers No. 12548 and 9959 have been checked and no inconsistency was observed. **CAR #2 was closed.**

The total population of the replaced transformers covered in this monitoring period were verified in a systematic approach. Discrepancy was observed, such as the NLL or LL value of the project transformers No. 13082, 24347 and 13959 were recorded as zero, the serial numbers of the project transformers No. 12472&12416, 1654&24488, 1469&22484, 3756&3828, 12069&12335, 3243&4440, etc. were recorded as the same one. **CAR#3** was raised, requesting the PP to clarify the discrepancy and take corrective actions in these regards. The NLL or LL values of the project transformers No. 13802, 24347 and 13959 have been corrected in the MIS system and the ER spreadsheet. The serial number and NLL/LL value of the transformers 469, 24488, 12335, 12416, 25054, 15596, 11616, 28417, 5529, 4304, 2483, 17953, 3701, 8773, 3243, 3828, 115 and 231 have been corrected in the MIS system and ER spreadsheet version 02. After cross checking with the manufacturer test report and the photos of the transformers, it is confirmed that the information has been correctly recorded in the MIS system and reported in the ER spreadsheet. **CAR #3 was closed.**

**CAR #4** was raised for the inconsistency of the project title and the PP's information in the MR version 02 and version 03 against the information on the UNFCCC website; in addition, the map in page 3 was not clear. The relevant corrections have been made in the MR version 05 dated 02/07/2014, **CAR #4 was closed.**

**CAR #5** was raised for the inconsistency of project emissions in section E.2 of MR version 03, the typo in cover page and the calculation of the CERs achieved up to 31/12/2012 (inclusive) and from 01/01/2013 (inclusive) in ER spreadsheet version 02. The project emission is corrected to be 29,987 tCO<sub>2</sub>e in the revised MR version 04 dated 26/05/2014. The typo in cover page of the ER sheet is corrected. The CERs achieved up to 31/12/2012 (inclusive) and from 01/01/2013 (inclusive) in ER sheet is transparently provided in the ER sheet version 03 dated 26/05/2014. **CAR #5 was closed.**

The compliance of the environmental requirements specified in the CPA-DDs during the procurement, installation, exchange and scrapping of transformers was also checked by the assessment team. As per the Reply Letter on Relevant Issues of SGCC In-advance Distribution Transformer Replacement CDM Programme (/32/), environmental impact assessment is not required for this project activity. The SGCC and the World Bank have taken measures to ensure SGCC DT PoA meets all the environmental regulations. The environmental management plans (/33/) prepared by the World Bank and the witness report of scrapping of the baseline transformers have been reviewed by the assessment team. Also, the World Bank has commissioned a project supervision team including the environmental specialist to check the compliance of the agreed environment management plan from 25-26 March 2013 (/35/). It was confirmed that the implementation of the project complied with the relevant requirements.

The Monitoring Report contains the comparison of the actual emission reduction claimed for the monitoring period with the estimate in the registered CPA-DDs.

CPAs	Values estimated in ex-ante calculation of CPA-DDs	Actual values achieved during this monitoring period	Justifications for the reason of difference
CPA-001	8,515	8,295	Abnormality of some transformers. These abnormal transformers were excluded from calculation.
CPA-002	47,175	20,397	Delayed replacement and the abnormality of some transformers.
CPA-003	48,604	35,593	
CPA-004	55,425	10,609	
PoA	159,719	74,894	

The reason for the actual emission reduction being less than the estimate, was verified by the assessment team by checking the replacement status and the operation status of the project transformers in the MIS system and the ER calculation spreadsheet. It is concluded that the justification of less ER is reasonable.

### **3.2 Post registration changes**

#### **3.2.1 Temporary deviations from registered monitoring plan or applied methodology**

There are no temporary deviations from registered monitoring plan or applied methodology in this monitoring period.

#### **3.2.2 Corrections**

There are no corrections in this monitoring period.

#### **3.2.3 Permanent changes from registered monitoring plan or applied methodology**

There are no permanent changes from registered monitoring plan or applied methodology in this monitoring period.

#### **3.2.4 Changes to project design of registered project activity**

There are no changes to project design of registered project activity in this monitoring period.

#### **3.2.5 Changes to start date of crediting period**

The start date of crediting period of the PoA and CPA-001 on the UNFCCC website was 01/01/2012 which was revised to be 12/02/2011. No change of the start date of the crediting period was made to the CPA0002, CPA003 and CPA-004.



### 3.3 Remaining Issues, CAR's, FAR's from Previous Validation or Verification

This is the second periodic verification of the PoA. After reviewing the validation report and the verification report of the first periodic verification, it is confirmed that there is no remaining issue from the validation of the project and the first periodic verification (14/15/).

### 3.4 Completeness and accuracy of Monitoring

#### 3.4.1 Sampling Plan used for verification

##### 1. Objectives and Reliability Requirements

The CPA-001 to CPA-004 only claims ERs from no-load losses. No-load losses occur whenever a transformer is energised and remain constant regardless of the amount of electricity flowing through it. These losses are related to the features, the thickness and the lamination method of core materials and the manufacturing technique and are not related to the load.

Since no-load losses related with the feature of the transformer itself and impact on the ERs directly, the no-load loss value of the baseline/project transformer in No. z in-advance replacement in year y (NLL) is chosen as the parameter of interest. Besides, the load loss of the baseline/project transformer is also included as the parameter of interest.

According to the PoA DD, the PP did not apply a sampling approach and monitored all parameter values. Thus, the assessment team applied a sample approach for the verification of this project according to Standard: Sampling and surveys for CDM project activities and programmes of activities Version 04.1 (/29/) and Guideline: Sampling and surveys for CDM project activities and programmes of activities Version 03.0 (/30/). The sample size selection is dependent on standard deviation as well as the target level of confidence and the precision (e.g. 95/10). This sampling plan is prepared for verifying the monitoring parameter values and has been checked by the statistical expert in the team.

##### 2. Target Population

This (2<sup>nd</sup>) monitoring period is from 01/12/2011 to 31/12/2013. The parameter of interest is the no-load and load loss value of the baseline/project transformer in No. z in-advance replacement in year y. Thus, the target population is the no-load and load loss value of the baseline/project transformer in No. z in-advance replacement in year y of 12,250 normally replaced transformers.

##### 3. Sampling Method

Firstly, Stratified Random Sampling is adopted to analyse the representative samples.

According to the PoA-DD and CPA-DDs, no-load losses are related to the features, the thickness and the lamination method of core materials and the manufacturing technique and are not related to the load. Also the actual no-load loss value of the project transformer in No. z *in-advance replacement* in year y (NLL<sub>PJ,z,y</sub>) are derived from the manufacturer test report of the baseline and project transformer (/17//18/). Thus, the actual no-load loss may be different for different capacity. The no-load losses of transformer are related with the Rated Capacity (kVA) of transformers. Due to different Rated Capacity are included in the Stratified Random Sampling CPAs, the population is divided into several sub-populations according to different Rated Capacity of transformers. In each sub-population, the sample size for each sub-population is divided on the basis of the proportion of Rated Capacity of transformers. 95% confidence interval and 10% of precision is used for sample size selection for the target population.

Secondly, the simple random sampling is also chosen to analyse the simple size for cross reference. 95% confidence interval and 10% of precision is used for sample size selection for the target population. The transformer in No. z *in-advance replacement* is random chosen for sampling.

Finally, the larger sample size between Stratified Random and Simple Random Simple is chosen to verify the monitoring parameter values.

##### 4. Sample size

The transformers marked as "abnormal" and "No" are not included in the calculation of emission reduction and also not included in the samples selection. The assessment team opinion is that the exclusion of

transformers marked as “abnormal” and “No” makes the sample selection more reliable and efficient. Following EB67 Annex 6, the following steps is used to analyse the sample size.

**Step 1: Example 6 - Stratified random sampling** is used to calculate the sample size.

The following equation is used to calculate the sample size:

$$SD = \sqrt{\frac{(g_a \times SD_a^2) + (g_b \times SD_b^2) + (g_c \times SD_c^2) + \dots + (g_k \times SD_k^2)}{N}} \quad (\text{Equation 1})$$

Where:

$SD$  =Weighted overall standard deviation,  $SD_i$  Standard deviation of the  $i^{\text{th}}$  group where  $i=1, \dots, k$

$g_a$  =Size of the  $i^{\text{th}}$  group where  $i=1, \dots, k$   
 $N$  =total number of transformers

$$\text{mean} = \frac{(g_a \times m_a) + (g_b \times m_b) + (g_c \times m_c) + \dots + (g_k \times m_k)}{N} \quad (\text{Equation 2})$$

Where:

$\text{mean}$  = Weighted overall mean  
 $m_i$  =mean of the  $i^{\text{th}}$  group where  $i=1, \dots, k$

$$n \geq \frac{1.96^2 NV}{(N-1) \times 0.1^2 + 1.96^2 V} \quad (\text{Equation 3})$$

Where:

$V = \left(\frac{SD}{\text{mean}}\right)^2$   
 $n$  =Sample size  
 $N$  =total number of transformers  
 $\text{mean}$  =is the overall mean  
 $SD$  =is the overall standard deviation  
 $1.96$  = represents the 95% confidence required  
 $0.1$  = represents the 10% relative precision

Thus, the calculation results of stratified random sampling are listed below:

	NLL <sub>BL</sub>	LL <sub>BL</sub>	NLL <sub>PJ</sub>	LL <sub>PJ</sub>
V	0.0453477	0.009516	0.402288	0.00081334
Confidence (95%)	1.96	1.96	1.96	1.96
Precision (10%)	0.1	0.1	0.1	0.1
population	12,250	12,250	12,250	12,250
sample size n	17	4	153	0

**Step 2: Example 5 - Simple random sampling** is used to recalculate the sample size.

Equation 3 is used to determine the sample size. The calculation results are listed below:

	NLL <sub>BL</sub>	LL <sub>BL</sub>	NLL <sub>PJ</sub>	LL <sub>PJ</sub>
Confidence (95%)	1.96	1.96	1.96	1.96
Precision (10%)	0.1	0.1	0.1	0.1
population	12,250	12,250	12,250	12,250
sample size n	84	92	396	214

**Step 3:** Cross checking with Stratified sampling result and Simple sampling result and adopt the largest one.

methods	Simple random sampling	Stratified random sampling	largest size
sample size n	396	153	396

Thus, the largest sample size 396 is chosen to further analyse the sample selection.

**Step 4:** calculate the samples for each capacity.

The sample sizes do not take into account non-response because all the data (transformer marked as “Yes”) are available for checking by the assessment team. When the sample is apportioned to each sub-population based on the proportion of the capacity, 5% adjusted values are added to each sub-population. The round up to integer method is also adopted to calculate the final allocation.

Thus, the recalculated sample size is listed below:

Capacity (kVA)	population number	sample number
30	6	1
50	195	7
80	32	2
100	1,378	47
125	2	1
160	546	19
200	1,658	57
250	187	7
315	4,169	142
400	1,749	60
500	55	2
630	1,100	38
800	831	29
1000	303	11
1250	35	2
1600	4	1
total	12,250	426

## 5. Sampling Frame

The sampling frame includes all capacities of transformers in CPA-001 to CPA-004. The details are based on the numbers and distribution of the transformers in CPA-001 to CPA-004.

Capacity(kV A)	Beijing	Chongqing	Gansu	Hebei	Heilongjiang	Henan	Hubei	Hunan	Jilin	Liaoning	Ningxia	Shanghai	Shanxi	Sichuan	Total
30									1						1
50					2			1	2	1		1			7
80								1	1						2
100			1		7		1	1	7	17		13			47
125					1										1
160					2				2	11		4			19
200			1		9		1	1	9	33		2	1		57
250			1						4	1		1			7
315	2	3	1		16	1	3	2	8	66	1	38)	1		142
400		1		6					1	13		36	1	2	60
500										1		1			2
630									1	24		13			38
800	1				3					1		24			29
1000												11			11
1250												2			2
1600												1			1
total	3	4	4	6	40	1	5	6	36	168	1	147	3	2	426

Under this sampling frame, the transformers valid under the PoA (marked as “Yes”) of different capacities have been chosen from the entire population and checked by the assessment team.

It is worth noting that the assessment team did not physically check all the 426 project transformers included in the sampling plan during the site visit because the purpose of physical check of project transformers is to verify project implementation and operational status of the replacement and emission reductions calculation of the CPAs is not related to the location of the transformers and all the data required to be verified were properly kept in the MIS system which can be fully checked in the provincial grid company of Liaoning Province (located in Shenyang City) and Shanghai City. The data used in the emission reductions in the samples have been completely checked by the assessment team, by checking the MIS system and related evidences including the Operation Forms and manufacturer test report. The evidences were all delivered to provincial grid company in Shenyang and Shanghai City, where the assessment team conducted the onsite verification for the assessment team's verification. The results of the verification for each parameter are discussed below. 23 sets of transformers located in Shenyang as well as 35 sets in Shanghai were randomly selected for on-site observation. Consistency was observed between the replaced transformers and the data in the MIS system.

Transformers that were onsite during the site visits.

Capacity (KVA)	100	160	200	250	315	400	500	630	800	1000	1250	1600	Total
Shanghai City	4	1	1	1	3	6	1	2	8	6	1	1	35
Shenyang City	2	0	4	0	8	5	1	2	1	0	0	0	23

The approach adopted by the assessment team is in compliance with EB 74 Annex 6 and EB 75 Annex 8: Standard: Sampling and surveys for CDM project activities and programmes of activities Version 04.1 and Guideline: Sampling and surveys for CDM project activities and programmes of activities Version 03.0 Verification of monitoring of parameters

The values of the parameters were checked following the sampling plan specified in section 3.4.1 above. Monitoring of reductions in GHG emissions to result from the registered project have been implemented in accordance with the monitoring plan contained in the registered PoA-DD and CPA-DDs. The monitoring mechanism is effective and reliable.

#### 3.4.1.1 $NLL_{PJ,Z,y}$ : The no-load loss value of the project transformer in No. z in-advance replacement

Monitoring Report, onsite checks Registered Monitoring Plan & Approved Methodology	Requirement in the applicable methodology and relevant EB Documents	Requirement in the registered monitoring plan	Implementation of the project	Conclusion on the compliance of the implementation with the monitoring plan & applicable methodology (Y/N)
<b>Data/Parameter</b>	The Technical energy losses of the project equipment shall be measured at least hourly to establish an annual average value, unless such losses cannot be metered. If the technical energy losses cannot be determined from metered data, they shall be calculated using the test results when	$NLL_{PJ,Z,y}$	$NLL_{PJ,Z,y}$	Y
<b>Description</b>		The no-load loss value of the project transformer in No. z in advance replacement in year y.	The no-load loss value of the project transformer in No. z in advance replacement in year y	Y
<b>Measured/Calculated/Default</b>		Measured in the manufacturer test report.	Measured by the manufacturers of transformers	Y
<b>Source of data</b>		The allowable no-load loss value defined in transformer standards whose effective date is earlier and most close to the date applying for registration of the CPA is adopted in the CPA-DD. Actual data will be the measured no-load loss value in the manufacturer test report of the project transformer.	The manufacturer test report of the project transformer	Y
<b>Monitoring</b>		/	/	/

equipment	the installed equipment is commissioned, and if these are not available use the procedures described under paragraphs 4 or 5 to estimate project technical energy losses as appropriate.			
Measuring/Reading/Recording frequency		Not mentioned.	Once for the whole project lifetime	Y
Calculation method (if applicable)		/	/	/
QA/QC procedures		The data obtained from manufacturer test reports of transformers are reliable. Relevant documents will be archived in the MIS System in electronic format for verification.	The data obtained from manufacturer test reports of transformers are reliable. Relevant documents have been archived for verification.	Y

As per the monitoring plan in the CPA-DDs, the actual data of no-load loss value of the project transformers will be the measured no-load loss value in the manufacturer test report of the project transformer.

Through checking the data in the MIS system and the verification of the sampled 426 unit of transformers, it was confirmed that the values in the manufacturer test reports of the project transformers (/17/) was adopted as the value of NLL, which is in compliance with the monitoring plan in the CPA-DDs.

The NLL of each project transformer was tested by the manufacturer and provided to the PP in the form of a manufacturer test report. After the replacement of the transformer, the on-site engineer reported the value in the test report in the MIS system and kept the original test report in the specific bureau in charge of the project transformers. The values inputted into the MIS system are subjected to be checked by the supervisors.

Following the sampling plan, the NLL values of the 426 project transformers have been checked by the assessment team. The values of the 426 project transformers in the MIS system and the manufacturer test reports were checked by the assessment team. It was confirmed that the values in the MIS system are in consistency with the manufacturer test reports and the values reported in the ER calculation sheet of the samples are consistent with the data sources.

In conclusion, the NLLs are monitored in compliance with the monitoring plan and the reported values of NLL in the revised ER sheet are consistent with the data sources for the samples and within reasonable range. The no-load losses of the baseline transformers are higher than the measured values of the project transformers.

#### 3.4.1.2 $LL_{PJ,Z,y}$ : The load loss value of the project transformer in No. z in-advance replacement in year y.

Monitoring Report, onsite checks Registered Monitoring Plan & Approved Methodology	Requirement in the applicable methodology and relevant EB Documents	Requirement in the registered monitoring plan	Implementation of the project	Conclusion on the compliance of the implementation with the monitoring plan & applicable methodology (Y/N)
Data/Parameter	The Technical energy losses of the project equipment shall be measured at least hourly to establish an annual average value, unless such losses	$LL_{PJ,Z,y}$	$LL_{PJ,Z,y}$	Y
Description		The load loss value of the project transformer in No. z in-advance replacement in year y.	The load loss value of the project transformer in No. z in-advance replacement in year y.	Y
Measured/Calculated/Default		Measured in the manufacturer test report.	Measured by the manufacturers of transformers	Y

<b>Source of data</b>	cannot be metered. If the technical energy losses cannot be determined from metered data, they shall be calculated using the test results when the installed equipment is commissioned, and if these are not available use the procedures described under paragraphs 4 or 5 to estimate project technical energy losses as appropriate.	The allowable load loss value defined in transformer standards whose effective date is earlier and most close to the date applying for registration of the CPA is adopted in the CPA-DD. Actual data will be the measured load loss value in the manufacturer test report of the project transformer. The parameter is only used for eligibility criteria.	The manufacturer test report of the project transformer	Y
<b>Monitoring equipment</b>		/	/	/
<b>Measuring/Reading/Recording frequency</b>		Not mentioned.	Once for the whole project lifetime	Y
<b>Calculation method (if applicable)</b>		/	/	/
<b>QA/QC procedures</b>		The data obtained from manufacturer test reports of transformers are reliable. Relevant documents will be archived in the MIS System in electronic format for verification.	The data obtained from manufacturer test reports of transformers are reliable. Relevant documents have been archived for verification.	Y

As per the monitoring plan, the actual data will be the measured load loss value in the manufacturer test report of the project transformer. The parameter is only used for the eligibility criteria analysis.

Through checking the data in the MIS system and the verification of the sampled 426 unit of transformers, it was confirmed that the values in the manufacturer test reports of the project transformers was adopted as the value of LL, which is in compliance with the monitoring plan in the CPA-DDs.

The LL of each project transformer was tested by the manufacturer and provided to PP in the form of manufacturer test report. After the replacement of the transformer, the on-site engineer reported the value in the test report in the MIS system and kept the original test report in the specific bureau in charge of the project transformers. The values inputted into the MIS system are subjected to be checked by the supervisors.

Following the sampling plan, the LL values of the 426 project transformers have been checked by the assessment team. The values of the 426 project transformers in the MIS system and the manufacturer test reports were checked by the assessment team. It was confirmed that the values in the MIS system are in consistency with the manufacturer test reports and the values reported in the ER calculation sheet of the samples are consistent with the data sources.

Therefore, it was confirmed that the LLs are monitored in compliance with the monitoring plan and the reported values of LL in the revised ER sheet are consistent with the data sources for the samples and within reasonable range. The load losses of the baseline transformers are higher than the measured values of the project transformers.



### 3.4.1.3 $D_{new,z}$ : The date when No. z in-advance replacement happens

Monitoring Report, onsite checks	Requirement in the applicable methodology and relevant EB Documents	Requirement in the registered monitoring plan	Implementation of the project	Conclusion on the compliance of the implementation with the monitoring plan & applicable methodology (Y/N)
Registered Monitoring Plan & Approved Methodology				
<b>Data/Parameter</b>	Not specified.	$D_{new,z}$ :	$D_{new,z}$ :	Y
<b>Description</b>		The date when No. z in-advance replacement happens	The date when No. z in-advance replacement happens	Y
<b>Measured/Calculated /Default</b>		Measured	Measured	Y
<b>Source of data</b>		The estimated year when the CPA-DD is submitted for registration. Actual data will be obtained from Operation Forms.	Operation forms	Y
<b>Monitoring equipment</b>		/	/	/
<b>Measuring/Reading/ Recording frequency</b>		Not mentioned.	Once for the whole project lifetime	Y
<b>Calculation method (if applicable)</b>		/	/	/
<b>QA/QC procedures</b>		Operation Forms will be archived for verification.	Operation Forms have been archived for verification	Y

As per the monitoring plan in the CPA-DDs, the replacement date on Operation Forms will be adopted and relevant documents will be archived in the MIS System in electronic format for verification.

Through checking the data in the MIS system and verification of the sampled transformers, it was confirmed that the values of the date when the transformer replacement happened was sourced from the date of replacement completion on the Operation Forms (/16/), and the values of replacement dates have been archived in the MIS system, which is in conformance with the monitoring plan.

As per the CDM manual (/22/) defined by the PP, an operation form is required for each replacement. The detailed information of the replacement including the operation number of the distribution transformer, the location, information of the original and new transformer, the date of replacement, the date of completion and the staff members in charge of the replacement are clearly indicated in the operation forms. After the replacement of the transformer, the on-site engineer recorded the replacement date in the operation form and reported the replacement date in the test report in the MIS system and kept the original test report in the specific bureau in charge of the project transformers. The values inputted into the MIS system are subjected to be checked by the supervisors.

Following the sampling plan, the replacement dates of the 426 project transformers have been checked by the assessment team. The replacement dates of the 426 project transformers in the MIS system and the operation forms were checked by the assessment team. One inconsistency (No. 10670) was observed and was addressed by the PP in response to CAR #2. It was confirmed that the replacement dates in the MIS system are in consistency with the operation forms and the values reported in the ER calculation sheet version 03 are consistent with the data sources.



Therefore, it was confirmed that the replacement dates are monitored in compliance with the monitoring plan and the reported values of replacement date in the ER sheet are consistent with the data sources for the samples.

**3.4.1.4  $PSL_{z,y}$ : The power supply reliability rate of the provincial grid that covers the project transformer in No. z in-advance replacement in year y.**

Monitoring Report, onsite checks Registered Monitoring Plan & Approved Methodology	Requirement in the applicable methodology and relevant EB Documents	Requirement in the registered monitoring plan	Implementation of the project	Conclusion on the compliance of the implementation with the monitoring plan & applicable methodology (Y/N)
<b>Data/Parameter</b>	Not specified.	$PSL_{z,y}$	$PSL_{z,y}$	Y
<b>Description</b>		The power supply reliability rate of the provincial grid that covers the project transformer in No. z in-advance replacement in year y	The power supply reliability rate of the provincial grid that covers the project transformer in No. z in-advance replacement in year y.	Y
<b>Measured/Calculated /Default</b>		default	default	Y
<b>Source of data</b>		Determined according to the data of 2008 publicly issued by Electric Power Reliability Management Center of State Electricity Regulatory Commission in the CPA-DD. Actual data will be updated annually according to the provincial location of the <i>in-advance replacement</i> in line with the data of the year (y-1) issued by Electric Power Reliability Management Center of State Electricity Regulatory Commission.	The latest data of the grids in provinces publicly issued by Electric Power Reliability Management Center of State Electricity Regulatory Commission	Y
<b>Monitoring equipment</b>		/	/	/
<b>Measuring/Reading/ Recording frequency</b>		/	/	/
<b>Calculation method (if applicable)</b>		/	/	/
<b>QA/QC procedures</b>		Relevant documents will be archived in the MIS System in electronic format for verification.	Relevant documents have been archived in the MIS System in electronic format for verification	Y

As per the monitoring plan in the registered CPA-DDs, the publicly available data from Electric Power Reliability Management Center of State Electricity Regulatory Commission are adopted and updated using the latest version before the implementation of monitoring.

It was confirmed that the latest publication from the Electric Power Reliability Management Center of State Electricity Regulatory Commission is the data for year 2011 (/23/). After checking the data in the monitoring report against the publication data, it was confirmed that the reported value of the power supply reliability rate of the provincial grid is monitored in compliance with the monitoring plan and the value is consistent with the publication from Electric Power Reliability Management Center of State Electricity Regulatory Commission.

**3.4.1.5  $n_{new}$ : The total number of in-advance replacements that are actually implemented in CPA-001 to CPA-004.**

Monitoring Report, onsite checks  Registered Monitoring Plan & Approved Methodology	Requirement in the applicable methodology and relevant EB Documents	Requirement in the registered monitoring plan	Implementation of the project	Conclusion on the compliance of the implementation with the monitoring plan & applicable methodology (Y/N)
<b>Data/Parameter</b>	The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.	$n_{new}$	$n_{new}$	Y
<b>Description</b>		The total number of in-advance replacements that are actually implemented in the CPA.	The total number of in-advance replacements that are actually implemented under CPA-001, CPA-002, CPA-003, CPA-004 respectively	Y
<b>Measured/Calculated /Default</b>		calculated	calculated	Y
<b>Source of data</b>		The data in the CPA are determined according to the plan of SGCC, supposing $n_{new}=n$ . Actual data will be determined according to data in the MIS System.	The MIS System	Y
<b>Monitoring equipment</b>		/	/	/
<b>Measuring/Reading/ Recording frequency</b>		Count according to the data in the MIS System	Determined according to the MIS System of SGCC DT PoA.	Y
<b>Calculation method (if applicable)</b>		Count according to the data in the MIS System.	Count according to data in the MIS System.	Y
<b>QA/QC procedures</b>		Cross check with other data archived in the MIS System.	Data are cross-checked when input into the MIS system.	Y

As per the monitoring plan, it is the count according to data in the MIS System and can be cross checked with other data archived in the MIS System, such as the replaced transformers.

Through the onsite visit, it was confirmed that the total number of the in-advance replacements that are actually implemented in the PoA is counted according to the data in the MIS system and can be cross checked with the other data archived in the MIS system, such as the replaced transformers, therefore, it is monitored in line with the monitoring plan.

As per the CDM manual defined by the PP, after the replacement of the transformer, the on-site engineer reported detailed information of the installed and replaced transformers in the MIS system including the replacement date, capacity, NLL and LL, manufacturers. Therefore, the total number of in-advance replacements that are actually implemented in the PoA can be determined by the MIS system.

However, as clarified in response to CL #1, the PP did not include the transformers replaced in year 2013 because the replacement information was not archived in the MIS system at the time of completing the monitoring report. It is accepted by the assessment team considering it is conservative and reasonable.

Following the sampling plan, the information of 426 project transformers recorded by the MIS system has been checked by the assessment team. Based on the checking results, the assessment team was convinced that the MIS system has been running smoothly and with the ability to record the data transparently. Moreover, the number of the replacements can be cross checked with the scrapping records (/25/) and witness reports (/26/) from the witness entities which are entrusted to witness the scrapping process of each transformer.

**3.4.1.6  $n_{old}$ : The total number of the scrapped transformers in in-advance replacements that are actually implemented in CPA-001 to CPA-004.**

Monitoring Report, onsite checks Registered Monitoring Plan & Approved Methodology	Requirement in the applicable methodology and relevant EB Documents	Requirement in the registered monitoring plan	Implementation of the project	Conclusion on the compliance of the implementation with the monitoring plan & applicable methodology (Y/N)
<b>Data/Parameter</b>	<p>The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.</p>	$n_{old}$	$n_{old}$	
<b>Description</b>		The total number of the scrapped transformers in in-advance replacements that are actually implemented in the CPA	The total number of the scrapped transformers in in-advance replacements that are actually implemented under CPA-001, CPA-002, CPA-003, CPA-004 respectively	
<b>Measured/Calculated /Default</b>		calculated	calculated	Y
<b>Source of data</b>		The data in the CPA are determined according to the plan of SGCC, supposing $n_{old}=n_{new}$ . Actual data will be determined according to the scrapping agreement(s).	The scrapping agreements	Y
<b>Monitoring equipment</b>		/	/	/
<b>Measuring/Reading/ Recording frequency</b>		Determined according to the scrapping agreement(s)	Determined according to the MIS System of SGCC DT PoA.	Y
<b>Calculation method (if applicable)</b>		Determined according to the scrapping agreement(s)	Count according to data in the scrapping agreement.	Y
<b>QA/QC procedures</b>		The scrapping agreement will be kept in SGCC for verification. Meanwhile, the number of the project transformers and the number of the baseline transformers that are in advance replaced in the CPA will be checked before scrapping, in order to ensure that they correspond with each other.	The scrapping agreements have been archived for verification.  Meanwhile, the number of the project transformers and the number of the baseline transformers that are in advance replaced in CPA have been checked before scrapping to ensure that they correspond with each other	Y

As per the monitoring plan, it is determined according to the scrapping agreement. As per the applied methodology, in case the project activity involves the replacement of equipment, and the leakage effect of the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check to see if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.

As per the CDM manual defined by the PP, the replaced transformers are scrapped by the designated scrapping entities and the scrapping agreements have been signed. Moreover, the independent entities are entrusted to witness the scrapping process of each baseline transformer and witness reports are provided to the PP including the numbers of the baseline transformers scrapped including the identification numbers. The information of scrapped transformers was also reported in the MIS system including the identification numbers, the capacity, NLL, LL and photo which can be used to check whether the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other.

After checking the scrapping agreement, the witness reports and MIS system, it was confirmed that the total number of the scrapped transformers in in-advance replacements that are actually implemented in the PoA was determined according to the scrapped agreement and independent monitoring of scrapping of replaced equipment was implemented. A check to see whether the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other has been conducted and consistency was found by the assessment team. Therefore, it was confirmed that the parameter has been monitored in accordance with the requirement of the monitoring plan and methodology.

### **3.4.2 Verification of implementation of sampling plan**

Not applicable. The PP did not apply a sampling plan.

### **3.5 Accuracy of Equipment**

No monitoring equipment is required for the implementation of the monitoring plan. After checking the values of the monitoring parameters reported in the MR version 05 and ER sheet version 03 against the records kept by the PP, it was confirmed that the monitoring results are consistently recorded as per approved frequency and the quality assurance and quality control procedures have been implemented as per the monitoring plan.

### **3.6 Summary of compliance with the calibration frequency requirements for measuring instruments.**

Not applicable.

### **3.7 Accuracy of Emission Reduction Calculations**

The calculation of emission reductions is found to be correct. CAR #2 and CAR #3 were raised regarding the ER calculation, the response to CARs was satisfactory and these were closed. The details of the reported and the verified values for all parameters are listed in section 4, 'Calculation of Emission Reductions'. The emission reduction in this monitoring period is verified to be 74,894 tCO<sub>2</sub>e. Therefore, even applying the lowest grid emission factor 0.78255 tCO<sub>2</sub>/MWh, the electricity saving by the project in this monitoring period is calculated as 95.7 GWh, the annual average saving is 45.9 GWh which is still lower than the 60GWh per year specified in the methodology.

100% of the data in the samples have been checked by the assessment team. Out of the 426 samples, the information of four transformers were found to contain discrepancies (please refer to CAR #2 in section 9 of this report), out of which, only one discrepancy (the replacement date of the transformer No. 10670 and the manufacture date of the baseline transformer No. 10668) has an effect on the emission reductions. Therefore, the proportion of discrepancies between the PP's records and DOE records (0.939% = 4/426) is within the level of Acceptable Quality Level (1%) and thus considered to be acceptable by the assessment team.

According to section E.6.2 of the PoA-DD, the emission reductions from the replacement of transformers can only be claimed for the days that

- (1) are after the date when No. z in-advance replacement is implemented, and
- (2) are not earlier than the starting date of the crediting period of the CPA that includes No. z in-advance replacement, and
- (3) are not later than the ending date of the crediting period of the CPA that includes No. z in-advance replacement, and
- (4) are not later than the date when the baseline transformer in No. z in-advance replacement is replaced in the absence of the CPA of SGCC DT PoA.

After checking the data in the ER calculation spreadsheet version 03, it was confirmed that the emission reductions from the PoA in this monitoring period was calculated for the period since the date of replacement and the date of the starting date of the crediting period of the CPAs and before the ending date of the crediting period and the date when the baseline transformers would be replaced in the absence of the CPAs in the PoA.

The assessment team confirms that:

- a) A complete set of data is available for this monitoring period. The data monitored have been properly recorded in the MIS system and 100% of the data in the sampling plan have been checked by the assessment team.
- b) The reported data have been checked against the manufacturer test report, national standards (/19/), scrapping agreement, operation forms, scrapping reports and witness reports.
- c) Appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been followed;
- d) The emission factors and default values that were applied in the calculations have been justified.

### **3.8 Quality of Evidence to Determine Emission Reductions**

Critical parameters used for the determination of the Emission Reductions are discussed in section 3.4 of this report. All the data recorded is in compliance with the monitoring report.

### **3.9 Management and operational System and Quality Assurance**

In order to verify data quality, the company involved in the project works in accordance with SGCC DT PoA Management Measures (/27/) and Management Information System Manual (/28/), which establishes the operational and management structure implemented. Both documents have been provided to the assessment team for review. It was confirmed that PP has established a complete management system for the implementation and operation of the PoA and CPAs with QA/QC measures clearly defined.

Also, relevant training has been taken on the staffs involved in the project. The training records (/31/) have been verified by the assessment team.

### **3.10 Data from External Sources**

1. The manufacturing time of the baseline transformer in No. z in-advance replacement ( $DATE_{BL,z,produce}$ ):

According to the registered CPA-DDs, the data is determined from the information on the nameplate of the baseline transformers. Through the onsite visit, it was found that the manufacturing time of the baseline transformers were recorded in the MIS system and photos of the nameplates of the baseline transformers have been taken and uploaded to the MIS system. Following the sampling plan, the manufacturing time of the 426 baseline transformers in the MIS system and the nameplates were checked by the assessment team. Out of the 426 samples, one inconsistency (manufacture date of the baseline transformer No. 10668) was observed and addressed by the PP in response to CAR #2. It was confirmed that the values in the MIS system are consistent with the nameplates and the values reported in the ER calculation sheet version 03 are consistent with the data sources.

2. The baseline no-load loss value in No. z in-advance replacement in year y ( $NLL_{BL,z,y}$ ):

According to the registered CPA-DD, the data is determined as the lower value of the no-load loss value, which is sourced from standards, of the baseline transformer and ( $NLL_{BL,Z,reg,y}$ ) and the measured no-load loss value on the manufacturer test report of the baseline transformer ( $NLL_{BL,Z,act,y}$ ) or 95% of  $NLL_{BL,Z,reg,y}$  will be adopted.  $NLL_{BL,Z,reg,y}$  is sourced from the national standards of the baseline transformers and  $NLL_{BL,Z,act,y}$  is sourced from the manufacturer test report for the baseline transformer (/18/). After each replacement, the on-site engineer reported the value of the baseline no-load loss value in the manufacturer test report into the MIS system and kept the original report at the local bureau. If the test report was not available, the values of the same type of transformers (Type S7 and S8) in the transformer standards whose effective date is earlier and most close to the manufacturing date of the baseline transformer were adopted with a 95% factor. The assessment team has checked the consistency of the national values in the MIS system with the relevant national standards, and consistency was found.

The value of  $NLL_{BL,Z,act,y}$  of the baseline transformers in the MIS system and the manufacturer test report were checked by the assessment team. It was confirmed that the values in the MIS system are consistent with the manufacturer test report and the values reported in the ER calculation sheet version 03 of the samples are consistent with the data sources.

3. The baseline load loss value in No. z in-advance replacement in year y ( $LL_{BL,z,y}$ ):

As per the CPA-DDs, the allowable load loss value of the same type of transformers defined in transformer standards whose effective date is earlier and most close to the manufacturing date of the baseline transformer is adopted. The baseline load loss value of each baseline transformer was kept in the MIS system. The data of baseline load loss value in the MIS system was checked against the relevant national transformer standards and consistency was found. Moreover, the values reported in the ER sheet version 03 of the baseline load loss value are found to be the same with the value in the MIS system.

4. The grid emission factor corresponding to No. z in-advance replacement ( $EF_{grid,z,y}$ ):

As per the CPA-DDs, the grid emission factor equals to the  $EF_{grid,CM,y}$  of the regional power grid where the No. z in-advance replacement takes place. The  $EF_{grid,z,y}$  is thus the same as  $EF_{grid,CM,y}$  of the grids which were ex-ante calculated and fixed throughout the crediting period. The value of  $EF_{grid,z,y}$  used in the MR version 05 and ER calculation sheet version 03 in consistency with the value in the registered CPA-DDs and the published data from the DNA of China (/36/).

5. The average replacing rate during 2006~2009 of the provinces covered by CPA-001 to CPA-004 (ARR):

After checking the CPA-DDs, it was confirmed that the values of ARR used in the MR is in conformance with the CPA-DDs.



#### 4. Calculation of Emission Reductions

Parameter	Reported Value in the MR version 01 and ER version 1.0	Verified Value in MR version 05 and ER sheet version 03
$NLL_{PJ,Z,y}$	Refer to ER sheet	Refer to ER sheet
$LL_{PJ,Z,y}$	Refer to ER sheet	Refer to ER sheet
$D_{new,z}$	Refer to ER sheet	Refer to ER sheet
$PSL_{z,y}$	Refer to ER sheet	Refer to ER sheet
$n_{new}$	12,250	12,250
$N_{old}$	12,250	12,250
$n$	28,621	28,621
$DATE_{BL,z,produce}$	Refer to ER sheet	Refer to ER sheet
$NLL_{BL,z,y}$	Refer to ER sheet	Refer to ER sheet
$LL_{BL,z,y}$	Refer to ER sheet	Refer to ER sheet
$EF_{grid,z,y}$ (tCO <sub>2</sub> e/MWh)	Northeast China Grid	0.92675
	North China Grid	0.89355
	East China Grid	0.78255
	Central China Grid	0.85285
	Northwest China Grid	0.83395
$EF_{grid,CM,y}$ (tCO <sub>2</sub> e/MWh)	Northeast China Grid	0.92675
	North China Grid	0.89355
	East China Grid	0.78255
	Central China Grid	0.85285
	Northwest China Grid	0.83395
ARP	Refer to ER sheet	Refer to ER sheet

The baseline emission is calculated using the following formulas:

$$BE_y = \sum_{z=1}^n BE_{z,y} = 104,881 \text{ tCO}_2\text{e}$$

$$BE_{z,y} = EL_{BL,z,y} \times EF_{grid,z,y} \times (1 - ARR)$$

$$EL_{BL,z,y} = NLL_{BL,z,y} \times H_{z,y} / 10^6$$

$$H_{z,y} = 8760 \times PSL_{z,y}$$

The project emission is calculated using the following formulas:

$$PE_y = \sum_{z=1}^n PE_{z,y} = 29,987 \text{ tCO}_2\text{e}$$

$$PE_{z,y} = NLL_{PJ,z,y} \times H_{z,y} \times EF_{grid,z,y} / 10^6$$

$$H_{z,y} = 8760 \times PSL_{z,y}$$

Leakage is not considered as per the CPA-DDs.

$$L_y = 0 \text{ tCO}_2\text{e}$$

The emission reduction is calculated using the following formula:

$$ER_y = BE_y - PE_y - L_y$$

$$= 104,881 \text{ tCO}_2\text{e} - 29,987 \text{ tCO}_2\text{e} - 0 \text{ tCO}_2\text{e}$$

$$= 74,894 \text{ tCO}_2\text{e}$$

**Emission Reduction:**

Period	Reported Value (as per the web hosted MR) tCO <sub>2</sub> e	Verified Value tCO <sub>2</sub> e	If Different, Summary of Issues That Caused the Difference
01/12/2011-31/12/2013	74,898	74,894	Please refer to CAR #2 and CAR #3 raised for the inconsistency of the reported value of replacement date, the NLL and LL of the replaced transformers.
<b>CERs (Up to 31 December 2012 (1st commitment period); )</b>	PoA: 21,315	PoA: 21,313 CPA- 001: 4,321 CPA- 002: 4,974 CPA- 003: 9,045 CPA- 004: 2,973	
<b>CERs (From 1 January 2013 onwards.</b>	PoA: 53,583	PoA: 53,581 CPA- 001: 3,974 CPA- 002: 15,423 CPA- 003: 26,548 CPA- 004: 7,636	



## **5. Recommendations for Changes in the Monitoring Plan**

No recommendation for changes in the monitoring plan was made during this (2<sup>nd</sup>) monitoring period.

## 6. Overview of Results

### Assessment Against the Provisions of Decision 17/CP.7:

Is the project documentation in accordance with the requirements of the registered POA-DD and CPA-DDs and relevant provision of decision 17/CP.7, EB decisions and guidance and the COP/MOP?

*Yes. The results of the compliance assessment are recorded in the verification checklist which is used as an internal report only.*

Have on-site inspections been performed that may comprise, inter alia, a review of performance records, interviews with project participants and local stakeholders, collection of measurements, observations of established practices and testing of the accuracy of monitoring equipment?

*Yes. Members of the assessment team visited the sites and undertook interviews, collected data, audited the implementation of procedures, checked calibration certificates and checked data, inter alia.*

*The results of the site visits are recorded in the verification checklist which is used as an internal report only.*

*The evidences have been checked and collected. The final monitoring report is attached with this verification report.*

Has data from additional sources been used? If yes, please detail the source and significance.

Data	Sources	Significance
PSL <sub>z,y</sub>	Electric Power Reliability Management Center of State Electricity Regulatory Commission	High
DATE <sub>BL,z,produce</sub>	The nameplate of the baseline transformers	Low
EF <sub>grid,CM,y</sub>	Registered CPA-DDs	High
ARR	Registered CPA-DDs	High
LL <sub>BL,z,y</sub>	National transformer standards	Low
NLL <sub>BL,z,y</sub>	National transformer standards Manufacturer Test Report	High

Please review the monitoring results and verify that the monitoring methodologies for the estimation of reductions in anthropogenic emissions by sources have been applied correctly and their documentation is complete and transparent.

*Yes. The monitoring methodology has been correctly applied and the monitoring report and supporting references are complete and transparent.*

Have any recommendations for changes to the monitoring methodology for any future crediting period been issued to the project participant?

*No.*

Determine the reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the CDM project activity, based on the data and information using calculation procedures consistent with those contained in the registered PoA-DD and CPA-DDs and the monitoring plan.

*The data used in anthropogenic emission reduction calculation is consistent with those contained in the registered POA-DD and CPA-DDs and monitoring plan. The emission reduction was 159,719 tCO<sub>2</sub>e for the period 01/12/2011 to 31/12/2013 as per the estimation made in the registered POA-DD and CPA-DDs. The actual emission reduction has been verified as 74,894 tCO<sub>2</sub>e for the same period.*

Identify and inform the project participants of any concerns related to the conformity of the actual project activity and its operation with the registered PoA-DD and CPA-DDs. Project participants shall address the concerns and supply relevant additional information.

*No such non conformity of the actual project activity and its operation with the*

Post monitoring report on UNFCCC website

*Yes, the monitoring report is available at ref. PoA 2896 on UNFCCC website*

[http://cdm.unfccc.int/PoAIssuance/mon\\_db/poamon540875007/edit?viewmode=1](http://cdm.unfccc.int/PoAIssuance/mon_db/poamon540875007/edit?viewmode=1)

## 7. Verification and Certification Statement

SGS United Kingdom Ltd has been contracted to perform the verification of the emission reductions reported for the Programme of Activity (PoA) SGCC In-advance Distribution Transformer Replacement CDM Programme (UNFCCC. Ref. No.: 2896) for the period from 01/12/2011 to 31/12/2013.

The verification is based on the validated and registered PoA-DD and CPA-DDs and the monitoring report for this project. Verification is performed in accordance with section I of Decision 3/CMP.1, and relevant decisions of the CDM EB and CoP/MoP. The scope of this engagement covers the verification and certification of greenhouse gas emission reductions generated by the above project during the above mentioned period, as reported in the MR version 05 dated 02/07/2014.

The management of IBRD is responsible for the preparation, calculation and determination of GHG emission reductions from the project. The development and maintenance of records and reporting procedures are in accordance with the monitoring report.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the period from 01/12/2011 to 31/12/2013 based on the reported emission reductions in the Monitoring Report version 05 dated 02/07/2014 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, SGS planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

SGS confirms that the project is implemented as described in the validated and registered PoA-DD and CPA-DDs. Based on the information we have seen and evaluated, we confirm the following:

PoA Title:	SGCC In-advance Distribution Transformer Replacement CDM Programme
UNFCCC Reference Number:	2896
Registered PoA-DD Used for Verification:	CDM SSC-PoA-DD version 05 dated 25/11/2010
CPAs included:	SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-001 SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-002 SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-003 SGCC In-advance Distribution Transformer Replacement CDM Programme CPA-004
UNFCCC Reference Number:	2896-0001 2896-0002 2896-0003 2896-0004
Registered CPA-DDs Used for Verification:	CPA-001: CDM SSC-CPA-DD version 04 dated 25/11/2010 CPA-002: CDM SSC-CPA-DD version 02 dated 25/04/2012 CPA-003: CDM SSC-CPA-DD version 02 dated 25/04/2012 CPA-004: CDM SSC-CPA-DD version 02 dated 25/04/2012

Methodology Used for Verification:	AMS.II.A. Version 10
Applicable Period:	01/12/2011 - 31/12/2013 (both days inclusive)
Total GHG Emission Reductions Verified:	74,894 tCO <sub>2</sub> e

**Signed on behalf of the Verification Body by Authorized Signatory**

Signature:



Name: Siddharth Yadav

Date: 18/07/2014

## 8. Document References

- /1/ UNFCCC webpage of the PoA  
[http://cdm.unfccc.int/ProgrammeOfActivities/poa\\_db/5DEPL4CVSQZAU23JR9H6F8KOYGMW70/view](http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/5DEPL4CVSQZAU23JR9H6F8KOYGMW70/view)
- /2/ UNFCCC webpage of the CPA -001  
[http://cdm.unfccc.int/ProgrammeOfActivities/cpa\\_db/IFY40C2XJ3OUBMWPRDV8NE16GLZQ9S/view](http://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/IFY40C2XJ3OUBMWPRDV8NE16GLZQ9S/view)
- /3/ UNFCCC webpage of the CPA -002  
[http://cdm.unfccc.int/ProgrammeOfActivities/cpa\\_db/NGCTYV6JFE5RQU2HZD9M08B7XKIWP4/view](http://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/NGCTYV6JFE5RQU2HZD9M08B7XKIWP4/view)
- /4/ UNFCCC webpage of the CPA -003  
[http://cdm.unfccc.int/ProgrammeOfActivities/cpa\\_db/SPO49A12X5LF3DCUYHT8N0JZ6W7VQM/view](http://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/SPO49A12X5LF3DCUYHT8N0JZ6W7VQM/view)
- /5/ UNFCCC webpage of the CPA -004  
[http://cdm.unfccc.int/ProgrammeOfActivities/cpa\\_db/JLBZ5WFHAQVGU8N07TOKPI23R4D6XC/view](http://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/JLBZ5WFHAQVGU8N07TOKPI23R4D6XC/view)
- /6/ Monitoring report Version 01 dated 26/02/2014, version 02 dated 08/04/2014, version 03 dated 30/04/2014, version 04 dated 26/05/2014 and version 05 dated 02/07/2014
- | Version | Date       | Nature of revision   |
|---------|------------|--|
| 01      | 26/02/2014 | Original version for publishing on the UNFCCC website;   |
| 02      | 08/04/2014 | 1. Footnote 1 was added in page 4 in response to CL #1;<br>2. Section E was updated in response to CAR #2 and CAR #3<br>3. Minor editorial changes;  |
| 03      | 30/04/2014 | 1. The PP 's information was updated in response to CAR #4;<br>2. Section B.2.5 was updated by PP;   |
| 04      | 26/05/2014 | 1. The project emission value is corrected in section E.2 of the MR in response to CAR #5  |
| 05      | 02/07/2014 | Minor issues were corrected in the MR in response to CAR #4(reopened) and CAR#5 (reopened).<br>1. Page 1: the title of the project is corrected;<br>2. Page 3, make the map clearer;<br>3. Page 3, section A.3: "Kingdom of Spain" is added.<br>4. Page 1 and section E7, breakdown of the CERs per CPA for the periods up to 31/12/2012 and after 01/01/2013. |
- /7/ ER calculation sheet for this monitoring period version 01 dated 28/01/2014, version 02 dated 08/04/2014, version 03 dated 26/05/2014
- /8/ CDM SSC-PoA-DD version 05 dated 25/11/2010
- /9/ CDM-SSC-CPA-DD for CPA-001 version 04 dated 25/11/2010
- /10/ CDM-SSC-CPA-DD for CPA-002 version 02 dated 25/04/2012
- /11/ CDM-SSC-CPA-DD for CPA-003 version 02 dated 25/04/2012

- /12/ CDM-SSC-CPA-DD for CPA-004 version 02 dated 25/04/2012
- /13/ Generic CPA-DD version 04 dated 25/11/2010
- /14/ SSC POA VALIDATION REPORT for the PoA Revision 1 dated 26/11/2010 issued by TUV Nord (Report No: 8000377132 – 09/485)
- /15/ Verification report of the first monitoring period version 5 dated 11/10/2012 issued by SGS
- /16/ Operation forms for the replacement
- /17/ Manufacturer test reports for the project transformers
- /18/ Manufacturer test reports for the baseline transformers
- /19/ National Standards for transformers related to the project  
GB6451.1-86; GB/T6451-1995; JB1300-1997; GB/T 6451-1999 ; GB/T 25446-2010 ;  
JB/T3837 – 1996 ; JB/T 3837-2010 ; GB 1094.1-1996
- /20/ AMS.II.A.: “Supply Side Energy Efficiency Improvements - Transmission and Distribution”  
Version 10
- /21/ Validation and Verification Standard version 07.0 dated 01/06/2014
- /22/ CDM Manual for the PoA DD
- /23/ Report of PSL in 2011 from the Electric Power Reliability Management Center of State  
Electricity Regulatory Commission  
<http://www.chinaer.org/info.aspx?n=20120724171938580722>
- /24/ Transformer purchasing agreement
- /25/ Scrapping agreement and scrapping reports
- /26/ Witness reports of the scrapping
- /27/ SGCC DT PoA Management Measures
- /28/ Management Information System Manual
- /29/ Standard: Sampling and surveys for CDM project activities and programmes of activities  
Version 04.1 dated 28/11/2013  
[http://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-0131128104214283/meth\\_stan05.pdf](http://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-0131128104214283/meth_stan05.pdf)
- /30/ Guideline: Sampling and surveys for CDM project activities and programmes of activities  
Version 03.0 dated 04/10/2014  
[http://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20131010103828368/meth\\_guid48.pdf](http://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20131010103828368/meth_guid48.pdf)
- /31/ Training records
- /32/ Reply Letter on Relevant Issues of SGCC In-advance Distribution Transformer Replacement  
CDM Programme
- /33/ Environmental Management Plan of SGCC DT PoA



- /34/ The replacement records for year 2013
- /35/ China Power Sector Transformer Efficiency Program (P116852) Aide-Memoire of the Project Supervision Mission
- /36/ 2009 Baseline Emission Factors for Regional Power Grids in China
- /37/ Video records for the scrapped transformers



## 9. Findings Overview

	CARs	CLs	FARs
Total Number raised	4	1	0

Date:	02/04/2014	Raised by:	Assessment Team		
Type:	CL	Number:	1	Reference:	Section 2.2 of checklist
<b>Lead Assessor Comment:</b>			<b>Date:</b> 02/04/2014		
According to the submitted monitoring report version 01 dated 26/02/2014, the monitoring report covers the monitoring period from 01/12/2011 to 31/12/2013. However, as verified during site visit, the transformers replaced in year 2013 were not included in the calculation of emission reductions. The PP was requested to provide related clarification and justifications in the monitoring report.					
<b>Project Participant Response:</b>			<b>Date:</b> 04/04/2014		
Monitoring data shows that 10,053 transformers have been replaced in the year of 2013. However, monitoring data of the 10,053 transformers was not entered into MIS system at the time that the monitoring report was published on the UNFCCC website. This is mainly due to the delayed replacement schedule in the year of 2013 (most transformers were replaced in 4 <sup>th</sup> quarter of 2013). For the purpose of conservativeness, it is decided to exclude the 10,053 transformers replaced in year 2013 from second monitoring period from 01/12/2011 to 31/12/2013.					
<b>Documentation Provided as Evidence by Project Participant:</b>					
1. The statistic table of transformers replaced in 2013					
<b>Information Verified by Lead Assessor:</b>					
The statistic table of transformers replaced in 2013 was provided. A note was provided in page 4 of the revised MR version 02 dated 08/04/2014 (provided by PP in response to this finding but was not listed by the PP in the section above). It is clarified that the transformers replaced in 2013 were not entered into MIS system by the time of completing the monitoring report. Therefore, PP decided to exclude the transformers replaced in 2013 for conservativeness.					
<b>Reasoning for not Acceptance or Acceptance and Close Out:</b>					
PP has clarified the reason for excluding the transformers in this monitoring period. It is considered by the assessment team to be reasonable and conservative. CL #1 was closed.					
<b>Acceptance and Close out by Lead Assessor:</b>			<b>Date:</b> 29/04/2014		

Date:	02/04/2014		Raised by:	Assessment Team	
Type:	CAR	Number:	2	Reference:	Section 2.2 of checklist
<b>Lead Assessor Comment:</b>				<b>Date:</b> 02/04/2014	
<p>During onsite visit, the related evidences such as the photos of the baseline and project transformers, manufacturer report of the transformers, the operation forms for the replacement for the sample transformers were checked against the information in the submitter emission reduction calculation sheet. Inconsistency were observed between the submitted sheet and the data sources, such as the serial number and the manufacture date of the baseline transformer No. 10668, the date of the replacement of the transformer No. 10670, the serial number of the transformer 13293 and 605. Also, the original evidences for the sample transformers No. 12548 and 9959 were not provided during the site visit. The PP was thus requested to correct this inconsistency and provide evidences for the remaining two transformers.</p>					
<b>Project Participant Response:</b>				<b>Date:</b> 04/04/2014	
<p>For the baseline transformer No. 10668, according to the photograph, the serial number is F87056 and the manufacture date is 01/03/1987. These are typo errors in the MIS system and Cells F908 and H908 of Sheet CAP-003 in the ER calculation spreadsheet (Version 1). However, these typo errors don't have impact on the final results of emission reductions. The relevant information has been updated in the MIS system and ER calculation spreadsheet (Version 2).</p> <p>For the transformer No. 10670, according to the operation form for the replacement, the date of the replacement is 24/10/2012. It is a typo error in the MIS system and Cell R910 of Sheet CPA-003 in the ER calculation spreadsheet (Version 1). The typo error leads the emission reductions of the transformer No. 10670 decrease from 21.88 tCO<sub>2</sub>e to 21.83 tCO<sub>2</sub>e. The relevant information has been updated in the MIS system and ER calculation spreadsheet (Version 2).</p> <p>For the baseline transformer No. 13293, according to the photograph, the serial number is 9105651. It is a typo error in the MIS system and Cell F3533 of Sheet CPA-003 in the ER calculation spreadsheet (Version 1). However, the typo error doesn't impact on the final results of emission reductions. The relevant information has been updated in the MIS system and ER calculation spreadsheet (Version 2).</p> <p>For the baseline transformer No. 605, the serial number is ZD94-5 according to the illustration from the witness company of transformers dismantling, Northeast Electric Power Research Institute Co., Ltd. It is a typo error in the witness report and Cell F607 of Sheet CPA-001 in the ER calculation spreadsheet (Version 1). However, the typo error doesn't impact on the final results of emission reductions. The relevant information has been updated in the ER calculation spreadsheet (Version 2).</p> <p>The original evidences for the sample transformers No. 12548 and 9959 have been provided to DOE.</p>					
<b>Documentation Provided as Evidence by Project Participant:</b>					
<ol style="list-style-type: none"> <li>1. The photograph of the baseline transformer No. 10668</li> <li>2. The operation form for the replacement of the transformer No. 10670</li> <li>3. The photograph of the baseline transformer No. 13293</li> <li>4. The illustration provided by the Witness company of transformers dismantling</li> <li>5. The original evidences for the sample transformers No. 12548 and 9959</li> </ol>					
<b>Information Verified by Lead Assessor:</b>					
<p>After reviewing the corrected information in the MIS system, the photos of the transformers, the operation forms, it is concluded that the observed inconsistency has been addressed. The information in the ER spreadsheet has been corrected as well.</p> <p>The original evidences of transformers No. 12548 and 9959 have been checked and no inconsistency was observed.</p>					
<b>Reasoning for not Acceptance or Acceptance and Close Out:</b>					
The inconsistency observed in the sampled transformers has been addressed. CAR #2 was closed.					
<b>Acceptance and Close out by Lead Assessor:</b>				<b>Date:</b> 29/04/2013	

Date:	02/04/2014		Raised by:	Assessment Team					
Type:	CAR	Number:	3		Reference:	Section 2.2 of checklist			
Lead Assessor Comment:				Date: 02/04/2014					
The total population of the replaced transformers covered in this monitoring period were verified in a systematic approach. Discrepancy was observed, such as the NLL or LL value of the project transformers No. 13802, 24347 and 13959 were recorded as zero, the serial numbers of the project transformers No. 12472&12416, 1654&24488, 1469&22484, 3756&3828, 12069&12335, 3243&4440, etc. were recorded as the same one. The PP was requested to clarify the discrepancy and take corrective actions in these regards.									
Project Participant Response:				Date: 08/04/2014					
The NLL or LL value of the project transformers No. 13802, 24347 and 13959 were recorded as zero, which are typo errors in the MIS system and the ER calculation spreadsheet (Version 1). According to the manufactured reports of the transformers mentioned above, the $NLL_{PJ,z,y}$ and $LL_{PJ,z,y}$ of No. 13802 are 0.284 kW and 4.842 kW, respectively; the $NLL_{PJ,z,y}$ and $LL_{PJ,z,y}$ of No. 24347 is 0.108 kW and 3.613 kW, respectively; the $NLL_{PJ,z,y}$ and $LL_{PJ,z,y}$ of No. 13959 are 0.106 kW and 3.682 kW, respectively. The relevant information has been updated in the ER calculation spreadsheet (Version 2). These corrections make the emission reductions generated from the above three project transformers (No. 13802, 24347 and 13959) decrease from 11.06 tCO <sub>2</sub> e to 7.97 tCO <sub>2</sub> e, from 4.67 tCO <sub>2</sub> e to 3.51 tCO <sub>2</sub> e, from 4.67 tCO <sub>2</sub> e to 3.53 tCO <sub>2</sub> e, respectively.									
Repetitive serial numbers have occurred in 71 pairs of project transformers, which listed detailed in the “Repeated SN.xlsx” provided by the DOE. Through the cross-check with photos and manufactured reports of these transformers, the situation can be categorized into the following two: 1) same serials numbers are given to two or multiple transformers: 53 pairs of project transformers indeed have the same serial numbers, which is mainly caused by the same numbering method applied for the pair of transformers manufactured by different manufacturers, or the operational error at the time of manufacturing for the pair of transformers manufactured by the same manufacturer. 2) typo errors in the MIS system and ER calculation spreadsheet (Version 1) lead to the repeated SN problem, including project transformers No. 1469, 24488, 12335, 12416, 25054, 15596, 11616, 28417, 5529, 4304, 2483, 17953, 3701, 8773, 3243, 3828, 115 and 231. The correct serial number and corresponding parameters including $NLL_{PJ,z,y}$ , and $LL_{PJ,z,y}$ of these transformers have been corrected in the MIS system and been updated in the ER calculation spreadsheet (Version 2). The relevant information and the impact on the emission reductions are listed in the following table.									
Sequ ential numb er	Recorded MIS information of repetitive transformer units				Corrected information of corresponding transformer units				Resulted change in emission reducti ons
	Original serial number	$NLL_{PJ,z,y}$ (kW)	$LL_{PJ,z,y}$ (KW)	Emissi on reducti ons	Actual serial number	$NLL_{PJ,z,y}$ (kW)	$LL_{PJ,z,y}$ (KW)	Emissi on reducti ons	
1469	B110808 6-36	0.278	7.533	15.41	B111004 8-36	0.439	8.004	13.66	-1.75
24488	12315644 DW	0.32	3.624	2.46	12315711 DW	0.324	3.678	2.42	-0.04
12335	12315647 DW	0.32	3.68	2.45	12315629 DW	0.326	3.651	2.40	-0.05
12416	12100128 DW	0.139	1.5	1.40	12100122 DW	0.132	1.532	1.46	+0.06
25054	12050113 -85	0.131	3.001	7.93	B110512 9-19	0.141	4.127	7.82	-0.11
15596	B110909 4-11	0.053	1.469	2.70	B110909 4-14	0.053	1.469	2.70	0
11616	20120623 3	0.129	3.677	4.86	20120623 6	0.129	3.677	4.86	0
28417	121507- 9-52	0.143	3.658	5.25	121507-1	0.143	3.658	5.25	0
5529	13110504 08-4	0.105	2.681	5.23	13110504 08-18	0.105	2.681	5.23	0
4304	ZBDW10 01-36	0.147	3.869	7.38	11016-22	0.147	3.869	7.38	0

2483	ZBDW10 01-43	0.131	3.863	7.58	ZBDW10 01-34	0.131	3.863	7.58	0
17953	121503- 5-6	0.066	1.526	2.21	121503- 5-69	0.066	1.526	2.21	0
3701	121504- 5-19	0.084	1.3	4.11	121507- 9-11	0.098	2.584	3.97	-0.14
8773	KRB200D 11206	0.1	2.852	5.30	KRB200D 11184	0.1	2.852	5.30	0
3243	121501	0.159	3.741	9.68	121531	0.159	3.741	9.68	0
3828	5194	0.096	2.89	3.82	5205	0.096	2.89	3.82	0
115	10022-46	0.115	2.6	13.25	10022-45	0.104	2.618	13.44	+0.19
231	09078- 105	0.1	2.2	6.08	09065-47	0.08131	2.261	6.39	+0.31

**Documentation Provided as Evidence by Project Participant:**

1. The manufactured reports of the project transformers No. 13802, 24347 and 13959
2. The photos and manufactured reports of the transformers No. 1469, 24488, 12335, 12416, 25054, 15596, 11616, 28417, 5529, 4304, 2483, 17953, 3701, 8773, 3243, 3828, 115 and 231

**Information Verified by Lead Assessor:**

The NLL or LL value of the project transformers No. 13802, 24347 and 13959 has been corrected in the MIS system and the ER spreadsheet.

The serial number and NLL/LL value of the transformers 469, 24488, 12335, 12416, 25054, 15596, 11616, 28417, 5529, 4304, 2483, 17953, 3701, 8773, 3243, 3828, 115 and 231 have been corrected in the MIS system and ER spreadsheet.

After cross checking with the manufacturer test report and the photos of the transformers, it is confirmed that the information have been correctly recorded in the MIS system and reported in the ER spreadsheet.

**Reasoning for not Acceptance or Acceptance and Close Out:**

The discrepancy observed have been addressed by PP. CAR #3 was closed.

**Acceptance and Close out by Lead Assessor:**

**Date:** 29/04/2014

Date:	29/04/2014		Raised by:	Assessment Team	
Type:	CAR	Number:	4	Reference:	n/a
<b>Lead Assessor Comment:</b>				<b>Date:</b> 29/04/2014	
PP's information "Kingdom of Spain- Ministry of Environment and Rural and Marine Affairs; Ministry of Economy and Finance" in the MR version 02 is inconsistent with the PP's information "Kingdom of Spain - Ministry of Agriculture, Food and Environment and Ministry of Economy and Competitiveness" on the UNFCCC website. Please check and keep consistency.					
<b>Project Participant Response:</b>				<b>Date:</b> 30/04/2014	
The PP's information "Kingdom of Spain - Ministry of Environment and Rural and Marine Affairs; Ministry of Economy and Finance" has been changed to "Kingdom of Spain - Ministry of Agriculture, Food and Environment and Ministry of Economy and Competitiveness". The relevant contents in MR version 03 have been updated.					
<b>Documentation Provided as Evidence by Project Participant:</b>					
N/A					
<b>Information Verified by Lead Assessor:</b>					
The PP's information in the MR version 03 dated 30/04/2014 (provided by PP in response to this finding but was not listed by the PP in the section above) has been corrected to be consistent with the UNFCCC website.					
<b>Reasoning for not Acceptance or Acceptance and Close Out:</b>					
CAR #4 was revised.					

<b>Acceptance and Close out by Lead Assessor:</b>	<b>Date:</b> 04/05/2014
<b>Lead Assessor Comment:</b>	<b>Date:</b> 02/07/2014
<p>CAR #4 was reopened for the following issues identified in the MR version 04:</p> <p>Page 1: the title of the project in the MR included "4CPAs from CPA-001 to CPA-004" which is not consistent with the project title in the UNFCCC project page.</p> <p>Page 3, the map is not clear.</p> <p>Page 3, section A.3: "Kingdom of Spain" is missing from the PP title.</p>	
<b>Project Participant Response:</b>	<b>Date:</b> 02/07/2014
<p>Page 1: The title of the project activity in the MR has been updated according to the project title in the UNFCCC project page.</p> <p>Page 3: The map has been updated and became clearer.</p> <p>Page 3: In section A.3, the PP's name has been updated to "Kingdom of Spain- Ministry of Agriculture, Food and Environment and Ministry of Economy and Competitiveness".</p>	
<b>Documentation Provided as Evidence by Project Participant:</b>	
N/A	
<b>Information Verified by Lead Assessor:</b>	
<p>The inconsistency of the project title in the cover page and the PP's name in section A.3 of the MR version 04 were corrected in the MR version 05 dated 02/07/2014 (provided by PP in response to the finding but was not listed by the PP in the section above). The map on page 3 is replaced with a clearer one as well.</p>	
<b>Reasoning for not Acceptance or Acceptance and Close Out:</b>	
CAR #4 was closed.	
<b>Acceptance and Close out by Lead Assessor:</b>	<b>Date:</b> 14/07/2014

Date:	26/05/2014	Raised by:	Technical Review Team		
Type:	CAR	Number:	5	Reference:	n/a
Lead Assessor Comment:				Date: 26/05/2014	
a) For transparency, please calculate the CERs achieved up to 2013 and from 2013 in ER sheet.					
b) Cover page of ER sheet V02, the word “monitoring” is spelled as “Mointoring”. Please correct.					
c) In section E.2 of MR v03, the total PEy in this monitoring report is reported as “29,983” which is different with the value in the table “29,987”. Please check and make consistency.					
Project Participant Response:				Date: 26/05/2014	
a) The calculation processes of the CERs achieved up to 2013 and from 2013 have been added into the ER sheet version 03.					
b) The word “monitoring” is a typo in the cover page of ER sheet version 02, which has been corrected in ER sheet version 03.					
c) The total PEy in this monitoring period is 29,987 tCO <sub>2</sub> e. The “29,983” in section E.2 of MR version 03 is a typo, which has been corrected in MR version 04.					
Documentation Provided as Evidence by Project Participant:					
N/A					
Information Verified by Lead Assessor:					
The spelling is corrected in the cover page, the calculation of the CERs achieved up to 2013 and from 2013 was added in the ER sheet version 03 dated 26/05/2014 (provided by PP in response to this finding but was not listed by the PP in the section above).					
The total PEy in this monitoring period is corrected in section E.2 of the MR version 04 dated 26/05/2014 (provided by PP in response to this finding but was not listed by the PP in the section above).					
Reasoning for not Acceptance or Acceptance and Close Out:					
CAR #5 was closed.					
Acceptance and Close out by Lead Assessor:				Date:30/05/2014	
Michael Wu					
Lead Assessor Comment:				Date: 17/07/2014	
As per the UNFCCC PoA interface it was required that the breakdown for the GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31/12/2012 and the period from 01/01/2013 be reported and verified separately for each CPA.					

<b>Project Participant Response:</b>	<b>Date:</b> 26/05/2014
Revised MR Version 5 02/07/2014 provided with each CPA listing the values for CERs separately. Revised ER spreadsheet version 3 dated 26/05/2014 provided.	
<b>Documentation Provided as Evidence by Project Participant:</b>	
ER calculation spreadsheet 20140718.xls PoA2896 MR_20140718_cl.pdf	
<b>Information Verified by Lead Assessor:</b>	
ER Spreadsheet version 3 26/05/2014 with title ER calculation spreadsheet 20140718.xls And MR version 5 02/07/2014 with title PoA2896 MR_20140718_cl.pdf Noted that the client did not update the dates and versions inside the documents.	
<b>Reasoning for not Acceptance or Acceptance and Close Out:</b>	
Breakdown confirmed corrected based on verification steps.	
<b>Acceptance and Close out by Lead Assessor:</b> Michael Wu	<b>Date:</b> 18/07/2014

## 10. Statement of Competence

### Statement of Competence

Name: Michael  
Wu

#### Status

- Lead Assessor	x	- Expert	x
- Assessor	x	- Financial Expert	
- Local Assessor	China	- Technical Reviewer	x

#### Scopes of Expertise

##### 1. Energy Industries (renewable / non-renewable)

x

Technical Area(s): TA 1.2 Energy generation from renewable energy sources

##### 2. Energy Distribution

Technical Area(s):

##### 3. Energy Demand

Technical Area(s):

##### 4. Manufacturing

Technical Area(s):

##### 5. Chemical Industry

Technical Area(s):

##### 6. Construction

Technical Area(s):

##### 7. Transport

Technical Area(s):

##### 8. Mining/Mineral Production

Technical Area(s):

##### 9. Metal Production

Technical Area(s):

##### 10. Fugitive Emissions from Fuels (solid, oil and gas)

Technical Area(s):

##### 11. Fugitive Emissions from Production and

Consumption of Halocarbons and Sulphur Hexafluoride

Technical Area(s):

##### 12. Solvent Use

Technical Area(s):

##### 13. Waste Handling and Disposal

Technical Area(s):

##### 14. Afforestation and Reforestation

Technical Area(s):

##### 15. Agriculture

Technical Area(s):

Approved Member of Staff by:

Siddharth  
Yadav

Date:

19/10/2012





## Statement of Competence

Name: Sarah Chan

### Status

- Lead Assessor	x	- Expert	x
- Assessor	x	- Financial Expert	
- Local Assessor	China	- Technical Reviewer	

### Scopes of Expertise

<b>1. Energy Industries (renewable / non-renewable)</b>	<b>x</b>
Technical Area(s): TA1.2 Energy generation from renewable energy sources	
<b>2. Energy Distribution</b>	
Technical Area(s):	
<b>3. Energy Demand</b>	
Technical Area(s):	
<b>4. Manufacturing</b>	
Technical Area(s):	
<b>5. Chemical Industry</b>	
Technical Area(s):	
<b>6. Construction</b>	
Technical Area(s):	
<b>7. Transport</b>	
Technical Area(s):	
<b>8. Mining/Mineral Production</b>	
Technical Area(s):	
<b>9. Metal Production</b>	
Technical Area(s):	
<b>10.Fugitive Emissions from Fuels (solid, oil and gas)</b>	
Technical Area(s):	
<b>11.Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride</b>	<b>x</b>
Technical Area(s):TA11: 11.2 GHG capture and destruction	
<b>12.Solvent Use</b>	
Technical Area(s):	
<b>13.Waste Handling and Disposal</b>	
Technical Area(s):	
<b>14.Afforestation and Reforestation</b>	
Technical Area(s):	
<b>15.Agriculture</b>	
Technical Area(s):	

Approved Member of Staff by: Siddharth Yadav Date: 30/11/2012



## Statement of Competence

Name: **Vikas Bankar**

### Status

- Lead Assessor	<b>x</b>	- Expert	<b>x</b>
- Assessor	<b>x</b>	- Financial Expert	
- Local Assessor	<b>India</b>	- Technical Reviewer	<b>x</b>

### Scopes of Expertise

<b>1. Energy Industries (renewable / non-renewable)</b>	<b>x</b>
Technical Area(s): <i>TA 1.2 Energy generation from renewable energy sources</i>	
<b>2. Energy Distribution</b>	<b>x</b>
Technical Area(s): <i>TA 2.1 Electricity distribution TA 2.2 Heat distribution</i>	
<b>3. Energy Demand</b>	<b>x</b>
Technical Area(s): <i>TA 3.1 Energy Demand</i>	
<b>4. Manufacturing</b>	
Technical Area(s):	
<b>5. Chemical Industry</b>	
Technical Area(s):	
<b>6. Construction</b>	
Technical Area(s):	
<b>7. Transport</b>	
Technical Area(s):	
<b>8. Mining/Mineral Production</b>	
Technical Area(s):	
<b>9. Metal Production</b>	
Technical Area(s):	
<b>10.Fugitive Emissions from Fuels (solid, oil and gas)</b>	
Technical Area(s):	
<b>11.Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride</b>	
Technical Area(s):	
<b>12.Solvent Use</b>	
Technical Area(s):	
<b>13.Waste Handling and Disposal</b>	
Technical Area(s):	
<b>14.Afforestation and Reforestation</b>	
Technical Area(s):	
<b>15.Agriculture</b>	
Technical Area(s):	

Approved Member of Staff by: **Siddharth Yadav** Date: **17/07/2012**

## Statement of Competence

Name: Sergio Alvarado

### Status

- Lead Assessor	<input type="checkbox"/>	- Expert	<input type="checkbox"/>	- Statistical Expert	<input checked="" type="checkbox"/>
- Assessor	<input type="checkbox"/>	- Financial Expert	<input type="checkbox"/>		<input type="checkbox"/>
- Local Assessor	<input type="checkbox"/>	- Technical Reviewer	<input type="checkbox"/>		<input type="checkbox"/>

### Scopes of Expertise

<b>1. Energy Industries (renewable / non-renewable)</b>	<input type="checkbox"/>
Technical Area(s):	
<b>2. Energy Distribution</b>	<input type="checkbox"/>
Technical Area(s):	
<b>3. Energy Demand</b>	<input type="checkbox"/>
Technical Area(s):	
<b>4. Manufacturing</b>	<input type="checkbox"/>
Technical Area(s):	
<b>5. Chemical Industry</b>	<input type="checkbox"/>
Technical Area(s):	
<b>6. Construction</b>	<input type="checkbox"/>
Technical Area(s):	
<b>7. Transport</b>	<input type="checkbox"/>
Technical Area(s):	
<b>8. Mining/Mineral Production</b>	<input type="checkbox"/>
Technical Area(s):	
<b>9. Metal Production</b>	<input type="checkbox"/>
Technical Area(s):	
<b>10. Fugitive Emissions from Fuels (solid, oil and gas)</b>	<input type="checkbox"/>
Technical Area(s):	
<b>11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride</b>	<input type="checkbox"/>
Technical Area(s):	
<b>12. Solvent Use</b>	<input type="checkbox"/>
Technical Area(s):	
<b>13. Waste Handling and Disposal</b>	<input type="checkbox"/>
Technical Area(s):	
<b>14. Afforestation and Reforestation</b>	<input type="checkbox"/>
Technical Area(s):	
<b>15. Agriculture</b>	<input type="checkbox"/>
Technical Area(s):	

Approved Member of Staff by:

Siddharth  
Yadav

Date:

08/02/2013

## Statement of Competence

Name: Linda Hu

### Status

- Lead Assessor	x	- Expert	x
- Assessor	x	- Financial Expert	
- Local Assessor	China	- Technical Reviewer	x

### Scopes of Expertise

<b>1. Energy Industries (renewable / non-renewable)</b>	<b>x</b>
Technical Area(s): 1.2 Energy generation from renewable energy sources	
<b>2. Energy Distribution</b>	
Technical Area(s):	
<b>3. Energy Demand</b>	
Technical Area(s):	
<b>4. Manufacturing</b>	
Technical Area(s):	
<b>5. Chemical Industry</b>	
Technical Area(s):	
<b>6. Construction</b>	
Technical Area(s):	
<b>7. Transport</b>	
Technical Area(s):	
<b>8. Mining/Mineral Production</b>	
Technical Area(s):	
<b>9. Metal Production</b>	
Technical Area(s):	
<b>10.Fugitive Emissions from Fuels (solid, oil and gas)</b>	
Technical Area(s):	
<b>11.Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride</b>	<b>x</b>
Technical Area(s): TA 11.2 GHG capture and destruction	
<b>12.Solvent Use</b>	
Technical Area(s):	
<b>13.Waste Handling and Disposal</b>	
Technical Area(s):	
<b>14.Afforestation and Reforestation</b>	
Technical Area(s):	
<b>15.Agriculture</b>	
Technical Area(s):	

Approved Member of Staff by: Siddharth Yadav Date: 10/09/2012

## Statement of Competence

Name: Shivaji  
Chakraborty

### Status

- Lead Assessor	x	- Expert	x
- Assessor	x	- Financial Expert	
- Local Assessor	India	- Technical Reviewer	x

### Scopes of Expertise

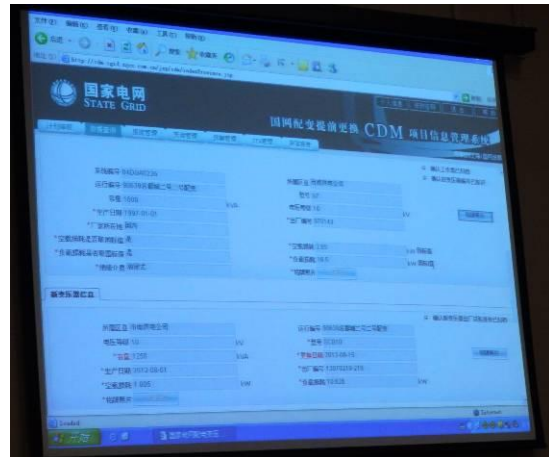
<b>1. Energy Industries (renewable / non-renewable)</b>	<b>x</b>
Technical Area(s):	
TA 1.1 Thermal energy generation from fossil fuels and biomass including thermal electricity from solar	
TA 1.2 Energy generation from renewable energy sources	
<b>2. Energy Distribution</b>	<b>x</b>
Technical Area(s): TA 2.1 Electricity distribution	
TA 2.2 Heat distribution	
<b>3. Energy Demand</b>	<b>x</b>
Technical Area(s): TA 3.1 Energy Demand	
<b>4. Manufacturing</b>	
Technical Area(s):	
<b>5. Chemical Industry</b>	
Technical Area(s):	
<b>6. Construction</b>	
Technical Area(s):	
<b>7. Transport</b>	
Technical Area(s):	
<b>8. Mining/Mineral Production</b>	
Technical Area(s):	
<b>9. Metal Production</b>	
Technical Area(s):	
<b>10.Fugitive Emissions from Fuels (solid, oil and gas)</b>	
Technical Area(s):	
<b>11.Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride</b>	
Technical Area(s):	
<b>12.Solvent Use</b>	
Technical Area(s):	
<b>13.Waste Handling and Disposal</b>	
Technical Area(s):	
<b>14.Afforestation and Reforestation</b>	
Technical Area(s):	
<b>15.Agriculture</b>	
Technical Area(s):	

Approved Member of Staff by: Siddharth Yadav Date: 19/09/2012

## 11. Photographic Evidence

Name of equipment: MIS system

Date: 24/03/2014



Name of equipment: Project transformer located in Shenyang City (No. 17466) Date: 25/03/2014



Name of equipment: Project transformer located in Shanghai City (No.24952 ) Date: 27/03/2014



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