

Response to the question raised in request for review for the CDM project activity "Ningxia Federal Solar Cooker Project" (Ref. no.: 2924)

Dear Secretariat,

The DOE TUV Rheinland (China) Ltd was informed on 12 March 2012 that the CDM project "Ningxia Federal Solar Cooker Project" (Ref. no.: 2924) is requested for review because of one question received from the Executive Board. We would like to provide our response to the issue raised as the following.

In summary, we understand the issue raised and regret if the previous validation report did not reflect the discussions in sufficient detail. However, we hope that the explanation will find acceptance by the Executive Board.

Yours sincerely

Mr. Praveen N. Urs
DOE Manager
TUV Rheinland (China) Ltd.

Issue:

1) The DOE used the accumulated operating hours data (310 solar cookers sample) in order to determine the number of on-site sample size for another parameter (the number of solar cookers operating).

The DOE is requested to clarify how it has determined the sample size for its own on-site check of the number of solar cookers operational as per EB65 Annex 2 paragraph 24 guidance. Please refer to EB65 Annex 2 paragraph 24.

Response:

We would like to thank you so much for your question. Our response is summarized as below,

During the on-site verification of the project activity, the verification team applied on-site sampling because it was not realistic for the verification team to check all of 19,000 solar cookers in operation inside the project boundary.

The original on-site sampling plan comes from the concept “Determine the sample size based on the 90/10 confidence and precision rule” based on the “General guidelines for sampling and surveys for small-scale project activities (Version 01)”, EB50 Annex 30 (hereafter called “Sampling Guideline/ version 01”) in connection to the most conservative assumption of variance (50%). The verification team applied simple random sampling method from an official source (i.e. Statistics 1st Edition /28/). According to the random sampling method /28/, *the sampling size (n) (numbers of solar cooker systems to be checked based on unique serial number) can be determined in following steps:*

$$n = t^2 * \sigma^2 / \Delta x^2$$

Where

- a) *t* is the statistical factor corresponding to the confidence level; here the confidence level is selected as 90% which is complied with the Sampling Guideline/ version 01 so that *t* = 1.645;
- b) *σ* is the standard deviation which is based on most conservative assumption and in line to the registered PDD (i.e. square root of (0.5*(1-0.5)));
- c) *Δx* is the allowed sampling error and taken as 10%;

The **sampling size *n* is calculated as 68**. The detailed calculation is demonstrated in the on-site sampling spreadsheet /27.2/.

Due to the physical restriction, the verification team conducted the sampling by *two means (i.e. 6 solar cooker users in persons; 62 solar cooker users by telephone interviews)*. *The verification team apologizes to miss this full explanation in previous report.* From the interview results (see the sampling

spreadsheet /27.2/ with detailed records), it was found that,

- all of 68 sampled solar cookers in place with good condition;
- the unique serial number of each solar cooker that was correctly referred to the signed participation agreement and equipment receiving records /13/;
- no maintenance required during the monitoring period, and so on.

Date	Milestones
23-Nov-2009	General guidelines for sampling and surveys for small-scale project activities (Version 01) in EB50 Annex 30
1-Nov-2010	Monitoring report GSP of this periodic verification
23 to 25 -Nov-2010	On-site verification
10-May-2011	Date of request for issuance in UNFCCC
25-Nov-2011	Standard for sampling and surveys for CDM project activities and Programme of Activities (Version 02.0), EB65 Annex 2
12-Mar-2012	Request for review email from EB

The Sampling Guideline/ version 01 was then replaced by the Standard for sampling and surveys for CDM project activities and Programme of Activities (Version 02.0), EB65 Annex 2 (hereafter called "Sampling Standard/ Version 02").

Therefore, the verification team re-verified the on-site sampling according to the latest version of Sampling Standard/ Version 02 para. 24-26. *This performs as a crosschecking purpose due to availability of the documents during the verification process.*

24. In order to determine the size of the sample for field/onsite check, the DOE shall specify in advance, using own professional judgment:

- (i) Acceptable quality level or the Level of Assurance, i.e. the proportion of discrepancies between the PPs record and DOE record that are acceptable, e.g. 1%;
- (ii) The proportion of discrepancies between the PPs record and DOE record that are unacceptable, e.g. 10%.

25. The maximum errors associated with the determination indicated in paragraph 24 shall remain at levels indicated below:

- (i) A 5% chance that the DOE will wrongly reject the PPs records (i.e. reject a set of records of acceptable quality);
- (ii) A 5% chance that the DOE will wrongly accept the PPs records (i.e. accept a set of records which is unacceptable).

26. Using provisions under 24 to 25 the DOE shall determine:

- n: the size of the sample;
- c: the acceptance number.

If the DOE observes greater than c discrepant records in the sample then the PPs set of records is not accepted. If the number of discrepant records is equal to or less than c then the PPs set of records is accepted.

Here discrepancy between the PPs record and DOE record is defined as different outcomes of Use/Not use from the same solar cooker system user.

The verification team followed the examples in Rule 24, i.e., 1% as acceptable proportion of discrepancies and 10% as unacceptable proportion of discrepancies. Then following Rule 25,

Type I error=Probability (Reject| Discrepancy $\leq 1\%$) =0.05

Type II error=Probability (Accept| Discrepancy $\geq 10\%$) =0.05

Using SAS (a licensed statistical software <http://www.sas.com/>)¹ to calculate the sample size for a one-sample one-sided test on the proportion of discrepancy with the following settings:

- Null hypothesis: Proportion of discrepancy $\leq 1\%$
- Alternative hypothesis: Proportion of discrepancy $\geq 10\%$
- Alpha=Type I error=0.05
- Power=1-Type II error=1-0.05=0.95

The SAS codes and results are given below. Based on the output from SAS, the **sample size satisfying Rule 24 & 25 is $n=54$.**

----- SAS Codes -----

```
proc power ;  
    onesamplefreq test=z method=normal  
    nullproportion = 0.01  
    proportion = 0.1  
    ntotal = .
```

¹ SAS is an integrated system of software products provided by SAS Institute Inc. It originally was named Statistical Analysis System. <http://www.sas.com>

SAS is a licensed statistical analysis software used broadly by industrial. The version used for this analysis is SAS V9.2, licensed to PNC FINANCIAL SERVICES GROUP INC, Site 70063123.

See screenshot below (Appendix 1) for details on software version, license, computing codes, and outputs. For more details on the function of proc power, please refer to <http://support.sas.com/rnd/app/papers/power.pdf>.

NOTE: Copyright (c) 2002-2008 by SAS Institute Inc., Cary, NC, USA.

NOTE: SAS (r) Proprietary Software 9.2 (TS2M3)

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```
sides=1
alpha=0.05
power = 0.95;
run;
```

----- SAS Output -----

Output from SAS:

The SAS System

The POWER Procedure

Z Test for Binomial Proportion

Fixed Scenario Elements

Method	Normal approximation
Number of Sides	1
Null Proportion	0.01
Alpha	0.05
Binomial Proportion	0.1
Nominal Power	0.95
Variance Estimate	Null Variance

Computed N Total

Actual	N
Power	Total
0.951	54

----- End of SAS output -----

The verification team interviewed a statistic expert Dr. Peiyi Xi /xv/ regarding this sampling approach and advised by Dr. Xi that the sample size selected by the verification team during original on-site sampling plan (i.e. 68 numbers) was more conservative compared with the result from Rules 24-25 (i.e. 54 numbers). The conservative result was encouraged to apply.

Thus, verification team considers that the original on-site sampling (i.e. 68 sampling size) has already covered the required sampling size calculated from Rules 24-25. *The verification team considers the original 68 sampling size is conservative enough to apply for on-site sampling.*

The original on-site sampling results showed the consistent records to PP records. No any discrepancy records between the DOE records and PP records. Therefore, PP records were fully accepted; 19,000 solar cooker systems within the monitoring period considered as normal and all in operation.

In addition, the verification team considers a quality assurance on the on-site sampling check and the purpose of more solar cooker systems to be visited in subsequent verifications, **a FAR is issued.**

FAR02

Regarding the on-site sampling in next verification, the verification DOE shall not include the solar cooker systems that have been selected in previous verifications.

Annex 1: Reference document list

(The document numbering is consistent to the verification report (ver. 03))

/13/	NXFI and solar cooker users, Participation agreement and equipment receiving records, 1 st March ~ 25 th March 2010
/26.1/	UNFCCC, "General guidelines for sampling and surveys for small-scale project activities (Version 01), EB50 Annex 30
/26.2/	Standard for sampling and surveys for CDM project activities and Programme of Activities (Version 02.0), EB65 Annex 2
/27.2/	On-site sampling calculation spreadsheet
/28/	Zhou Xuebo, "Statistics", Economic Science Press, Beijing, 1 st Edition December 2008

Appendix 1

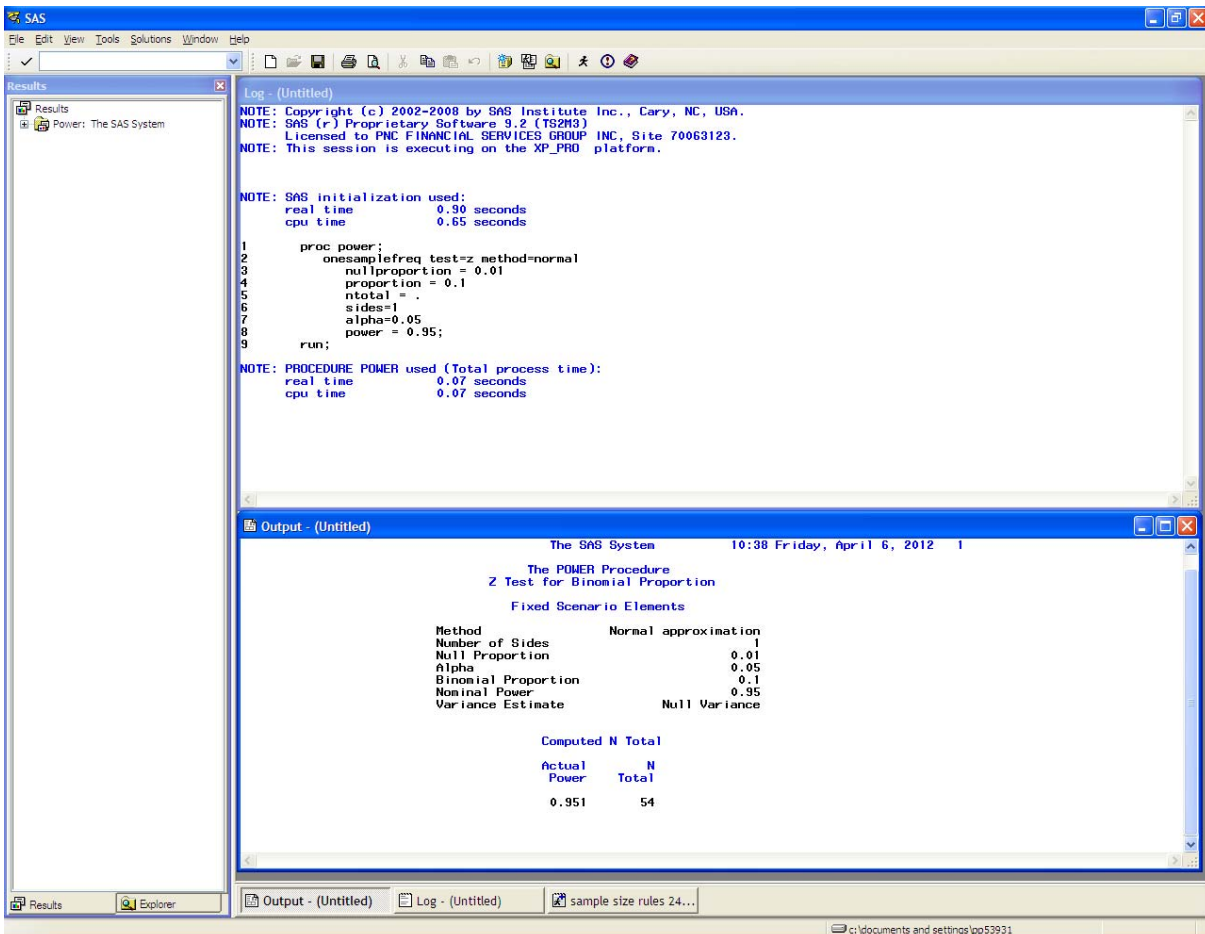
- SAS is an integrated system of software products provided by SAS Institute Inc. It originally was named Statistical Analysis System. <http://www.sas.com>
- SAS is a licensed statistical analysis software used broadly by industrial. The version used for this analysis is SAS V9.2, licensed to PNC FINANCIAL SERVICES GROUP INC, Site 70063123.
- See screenshot below (Appendix 1) for details on software version, license, computing codes, and outputs. For more details on the function of proc power, please refer to <http://support.sas.com/rnd/app/papers/power.pdf>.

NOTE: Copyright (c) 2002-2008 by SAS Institute Inc., Cary, NC, USA.

NOTE: SAS (r) Proprietary Software 9.2 (TS2M3)

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Screenshots for the SAS programme running to above calculation



The screenshot displays the SAS software interface with two main windows open: 'Log - (Untitled)' and 'Output - (Untitled)'.

Log - (Untitled) content:

```
NOTE: Copyright (c) 2002-2008 by SAS Institute Inc., Cary, NC, USA.
NOTE: SAS (r) Proprietary Software 9.2 (TS2M3)
NOTE: Licensed to PNC FINANCIAL SERVICES GROUP INC, Site 70063123.
NOTE: This session is executing on the XP_PRO platform.

NOTE: SAS initialization used:
      real time    0.30 seconds
      cpu time     0.65 seconds

1      proc power;
2          onesamplefreq test=z method=normal
3          nullproportion = 0.01
4          proportion = 0.1
5          ntotal = .
6          sides=1
7          alpha=0.05
8          power = 0.95;
9      run;

NOTE: PROCEDURE POWER used (Total process time):
      real time    0.07 seconds
      cpu time     0.07 seconds
```

Output - (Untitled) content:

The SAS System 10:38 Friday, April 6, 2012 1

The POWER Procedure
Z Test for Binomial Proportion

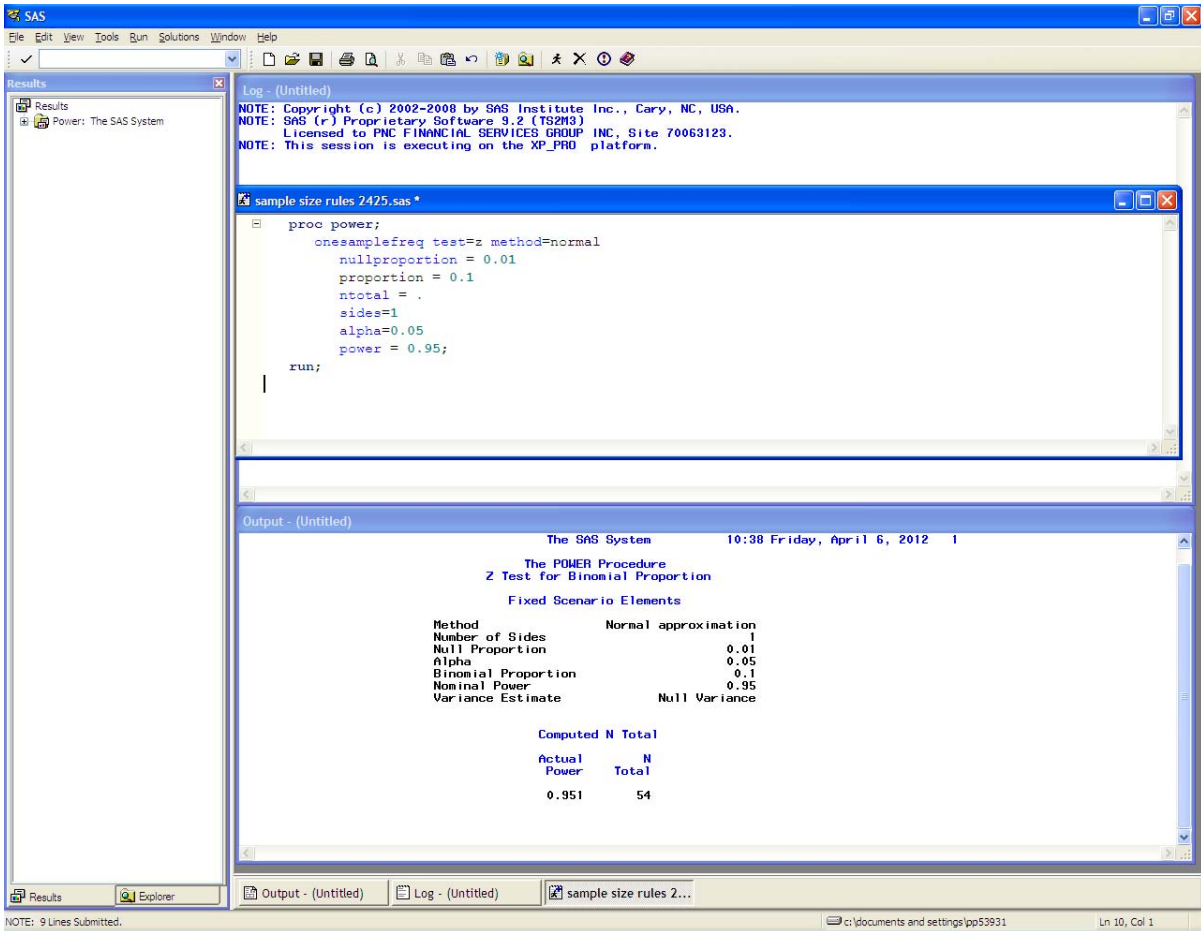
Fixed Scenario Elements

Method	Normal approximation
Number of Sides	1
Null Proportion	0.01
Alpha	0.05
Binomial Proportion	0.1
Nominal Power	0.95
Variance Estimate	Null Variance

Computed N Total

Actual Power	N Total
0.951	54

The bottom of the screenshot shows the taskbar with icons for Results, Explorer, Output - (Untitled), Log - (Untitled), and sample size rules 24...



The screenshot displays the SAS software interface with the following components:

- Log - (Untitled):** Contains copyright and licensing information for SAS Institute Inc., Cary, NC, USA, dated 2002-2008. It also notes the software version (9.2 TS2M3) and the platform (XP_PRO).
- sample size rules 2425.sas *:** A code window containing the following SAS code:


```
proc power;
  onesamplefreq test=z method=normal
    nullproportion = 0.01
    proportion = 0.1
    ntotal = .
    sides=1
    alpha=0.05
    power = 0.95;
run;
```
- Output - (Untitled):** Displays the results of the power analysis. It includes the title "The POWER Procedure" and "Z Test for Binomial Proportion". The output is organized into two main sections: "Fixed Scenario Elements" and "Computed N Total".

Fixed Scenario Elements	
Method	Normal approximation
Number of Sides	1
Null Proportion	0.01
Alpha	0.05
Binomial Proportion	0.1
Nominal Power	0.95
Variance Estimate	Null Variance

Computed N Total	
Actual Power	N Total
0.951	54

The status bar at the bottom indicates "NOTE: 9 Lines Submitted." and the file path "c:\documents and settings\pp53931".

-- End --