

# Mongolia - Energy and Environment Project 2012-2013, Stove Subsidies Component

## **Social Impact**

Report generated on: June 11, 2015

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# Sampling

## Sampling Procedure

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A sample size of 1096 was estimated to obtain 100% power to detect a 3.6 kg difference in daily coal use between traditional stove users and those using each of three different MCA models, accounting for expected attrition of households from data collection phase 1-phase 3. The treatment group sample is a random sample of MCA stove owners selected from complete stove sales lists of Khan Bank and Xacbank. Comparison households (traditional stove owners) were randomly selected from the Ministry of Labor and Social Welfare's 2010-2011 Proxy Means Test (PMT) data, a census of all Ulaanbaatar ger area households that was designed to assess poverty levels. The complete records from the Bank and PMT lists were stratified by dwelling type (ger or house) and stove type (Dul, Khas, Ulzii, or traditional), and households were randomly sampled within each stratum. While the sample was initially divided equally into dwelling and stove type strata, this allocation was adjusted during data collection since it was found that very few gers had Khas stoves, because the Khas stove was marketed as more suitable for houses due to its larger size. The Ger-Khas stratum was therefore reduced to only 15 observations. This allowed a reallocation of the survey sample to the other groups, increasing the size of the other strata to at least 150, thus increasing power.

At the start of Phase I data collection, a variety of challenges required that 35% of sampled households be replaced. First, there were numerous discrepancies in the household addresses within the bank and PMT lists on which the sampling framework was based. Of the households that data collectors attempted to interview, 13% identified through either list were actually living at another address, either because they moved or because an incorrect address was given or recorded in the lists; 4% of the listed addresses could not be located at all. In 2% of cases, enumerators discovered that the sampled home was actually an apartment building or business address, which were not eligible for the stove evaluation. While some of the households sampled from the PMT list would have moved since the time of the PMT survey two years prior to this evaluation, this would only explain a portion of discrepancies. Other reasons for sample replacements were address duplication in list (1%); no person home after 3 visits (3%); refusal to participate (3%); use of other improved stove model apart from MCA stove (4%); and household did not live in expected dwelling type per sampling list (5%).

Interviews were completed with 1,123 households in Phase I. There was a 6% attrition rate from Phase I to III, largely due to respondent fatigue, relocation, or continued absence of the intended respondent from the home. The final valid household survey sample at the end of the third phase of data collection was 1,057.

## Response Rate

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The expected sample size was 1096. At the start of Phase I data collection, a variety of challenges required that 35% (n=604) of sampled households be replaced. First, there were numerous discrepancies in the household addresses within the bank and PMT lists on which the sampling framework was based. Of the households that data collectors attempted to interview, 13% identified through either list were actually living at another address, either because they moved or because an incorrect address was given or recorded in the lists; 4% of the listed addresses could not be located at all. In 2% of cases, enumerators discovered that the sampled home was actually an apartment building or business address, which were not eligible for the stove evaluation. While some of the households sampled from the PMT list would have moved since the time of the PMT survey two years prior to this evaluation, this would only explain a portion of discrepancies. Other reasons for sample replacements were address duplication in list (1%); no person home after 3 visits (3%); refusal to participate (3%); use of other improved stove model apart from MCA stove (4%); and household did not live in expected dwelling type per sampling list (5%).

Following these replacements, 1,125 valid samples were obtained for Phase 1. Attrition dropped this number to 1079 in Phase 2 and 1057 in Phase 3.

## Weighting

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No weights were used.

# Questionnaires

## Overview

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The HOUSEHOLD SURVEY was administered to the individual most responsible for tending the stove, although other household members could assist in answering demographic questions if necessary. After obtaining informed consent, enumerators gathered information on each dwelling's physical characteristics such as construction materials and insulation. Enumerators measured dimensions of the room in which the main stove was located to allow estimation of the heating space volume. Demographic characteristics were collected for the full household roster, including information on age, gender, education, marital status, as well as employment status and income in the prior month from work, pensions, and other allowances for every household member. A general household expenditures section was added to the survey during Phases II and III to further document potential economic impacts beyond changes in income. Though the survey methods and the sample size were not designed to measure health outcomes reliably, respondents were asked to report current respiratory, cardiac, and dermal symptoms experienced by household members in vulnerable age groups (<5 and >60 years old), to collect some data on symptoms that could be associated with air pollution.

The survey captured the ownership and use of up to three stoves within each home, as well as any other heating and cooking devices. In addition, data were gathered on stove usage for cooking and heating, any modifications made to MCA stoves, and criteria-based personal preferences between MCA and traditional stoves. To determine whether MCA stove owners were compliant with lighting instructions, respondents were asked an open-ended question about how they light their stove, and enumerators recorded pre-coded responses.

Respondents reported recent expenditures on truckloads of coal and wood since the last data collection visit (for Phase I data collection, since June). The types of coal and wood purchased were also reported. Enumerators showed photos of truck sizes to help the respondent estimate the quantity purchased. Total purchases of coal and wood by the sack were also reported for the previous week and the past two weeks. Types of coal and wood and the per-sack prices for the most recent purchase were also reported.

To estimate the quantity of fuel used daily and the number of fueling events, cold starts, and warm refuelings, enumerators asked the main stove tender to recall the times of each fueling event in the 24 hours preceding the interview. For each event, enumerators asked the respondent the time, purpose (heating, cooking, or both), whether the stove was still warm or had unburnt coal or embers present, and the quantities of each fuel type used. Any fuelings in which embers or unburnt coal were present were considered warm refuelings. To further verify fuel quantities, respondents were asked to put the amount of coal they used into a bag or bucket, which enumerators then weighed with handheld digital scales and recorded after subtracting the weight of the container.

## Data Collection

### Data Collection Dates

Start	End	Cycle
2012-10-20	2012-11-08	Phase I
2013-01-12	2013-01-26	Phase II
2013-03-01	2013-03-31	Phase III

### DATA COLLECTION NOTES

Household data were collected using pen and paper in three phases to capture changes in stove usage patterns throughout the winter of 2012-2013 to account for temperature fluctuations. Data collection was contracted by MCA to be conducted by a joint venture between Robust LLC and the Institute of Philosophy, Sociology and Law (JVRIPSL). The data collection was implemented by 15 teams of two enumerators each, managed by three supervisors. All enumerators completed a three-day training prior to Phase I that covered research ethics, data collection instruments, and protocols. One-day refresher training was provided before Phases II and III of data collection. Interviews lasted approximately 1 hour. Upon verification of contact information in Phase I, enumerators pre-arranged convenient appointment times with the panel of stove tenders during Phases II and III.

Household air quality data were collected by trained students at Mongolian University of Science and Technology who set up air quality sampling devices in a sampled home in the evening around 6pm. The sampling equipment took continuous measurements throughout the evening until the same team returned the following morning to retrieve the equipment. No personal data were collected during this time. Readings from the equipment were recorded on paper and internally by the devices.

### Data Collectors

Name	Abbreviation	Affiliation
joint venture between Robust LLC and the Institute of Philosophy, Sociology and Law	JVRIPSL	
Mongolian University of Science and Technology (contracted by Social Impact)		

### SUPERVISION

For the household survey, teams of 2 enumerators visited each sampled household. One was the primary interviewer while the other would focus on household structure measurements and weighing coal and providing support to the main interviewer. Both men and women played both roles.

Supervisors assigned households to enumerator teams, responded to impromptu questions from the field, and reviewed data quality. Respondents were also free to call supervisors (numbers were provided through the consent process) if they had questions about the study.

For the air quality data collection, two teams of three set up equipment in the homes. Equipment readings were downloaded in a laboratory at MUST with assistance from a team leader.

## Data Processing

### Data Editing

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The data collection firm JVRIPSL was responsible for data cleaning. They performed skip logic checks. In addition, after each Phase, Social Impact sent data quality monitoring and logic checks findings to the JVRIPSL to highlight extreme outliers or skip logic errors that might indicate a data entry to data collection error. JVRIPSL reviewed paper forms and audio recordings of interviews to correct or rule out data entry errors, verified feasible outliers, and at times followed up with households again to obtain the accurate response.

### Other Processing

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The questionnaires were bundled by 10-15 and checked by the data entry supervisor before entry into the computer. Four data entry operators used three computers to enter data into forms in CSPro 5.0 software. Data were double entered. Data entry errors were identified and corrected using "Compare data" and "Batch Edit" modules of CSPro software program.

# Data Appraisal

No content available



## Related Materials

### Questionnaires

#### Mongolian Questionnaire

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Title Mongolian Questionnaire  
 Country Mongolia  
 Language Mongolian  
 Filename Mongolian Questionnaire.pdf

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#### Phase I Household Questionnaire

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Title Phase I Household Questionnaire  
 Country Mongolia  
 Language English  
 Filename HH Survey ENG- Phase I.doc

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#### Phase II Household Questionnaire

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Title Phase II Household Questionnaire  
 Country Mongolia  
 Language English  
 Filename HH Survey ENG- Phase II.docx

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#### Phase III Household Questionnaire

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Title Phase III Household Questionnaire  
 Country Mongolia  
 Language English  
 Filename HH Survey ENG- Phase III.docx

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### Reports

#### Final Evaluation Report Package

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Title Final Evaluation Report Package  
 Author(s) Social Impact  
 Date 2014-01-01  
 Country Mongolia  
 Language English  
 Description This folder contains the following documents: (i) Independent Evaluator Final Evaluation Report, (ii) MCC Management Response, (iii) MCC Summary of Findings with Lessons Learned.  
 Filename Final Evaluation Report Package.zip

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#### Mongolian Summary

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Title Mongolian Summary  
Country Mongolia  
Language Mongolian  
Filename execsummary-mng-eep-mongolian.pdf

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## Technical documents

### Evaluation Design Report

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Title Evaluation Design Report  
Author(s) Social Impact  
Date 2012-11-01  
Country Mongolia  
Filename designreport-mng-energyandenvironmental-v2-nov12.pdf

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## Other materials

### MCC Summary of Findings

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Title MCC Summary of Findings  
Author(s) MCC  
Filename <https://www.mcc.gov/docs/doc/summary-measuring-results-of-mng-eep>

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### MCC Management Response

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Title MCC Management Response  
Author(s) MCC  
Filename <https://www.mcc.gov/docs/doc/statement-mcc-management-response-to-mongolia-eep>

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