Afghanistan Energy Study

Household & Enterprise Energy Diaries

ADDENDUM TO THE INCEPTION REPORT

Submitted for World Bank approval on 14th February 2018

THE WORLD BANK

SAMUEL HALL.

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This short document represents an addendum to the initially submitted Inception Report clarifying all changes made to the methodology for the World Bank's 'Household and Enterprise Energy Diaries 2017-19' study being conducted by Samuel Hall in Afghanistan, which represents Activity 3 of the ongoing World Bank Afghanistan Energy Study.

In the course of preliminary research and resulting from discussions with various World Bank and other experts the research methodology has been refined to ensure that data collected will address the World Bank's key research outcomes for this study - namely, the energy usage of households, enterprises and institutions across Afghanistan and the ability and willingness to pay for improved services of these households, enterprises and institutions, informing the development of a strategy for electrification for the whole of Afghanistan.

1. LOCATIONS

Locations for sampling based on the proposal were confirmed with the World Bank and the input of Samuel Hall's Field Coordinator and Security Focal Point, and scouted during the Community Profiles phase of fieldwork in late December 2017 - early January 2018. (See Section 3.1. *Community Profiles* for more detail.) The following table outlines the final list of locations for the study going forward.

Kabul	Herat	Samangan	Paktia	Daikundi
Dasht-e-Barchi	Jebraeel	Mula Qurban	Baala Deh	Qarya Dasht
Karte Naw	Shaalbafaan	Chawghai	Habib Kala	Sar-e-Nili
Khair Khana	Naw Abad Shuhadaye	Talkhaki	Bano Zai	Sang-e-Mom
Deh Yahya	Majghandak	Dawlatabad	Narqese	Ghaf
Langar	Qala-e-Sharbat	Yakatoot	Mondakhail	Khuja Chasht
Shewaki	Malikiha	Lab-e-Aab	Patan Kalai	Charkh

Figure 1. Research Locations

Figure 2. Map of Research Locations

2. RESEARCH TOOLS AND SAMPLING STRATEGIES

The overall architecture of the study remains as outlined in the Inception Report, but individual tools and deployment strategies have been improved with the support of World Bank experts and building on the findings of preliminary research and analysis.

The following table outlines the research plan / structure:

Inception Phase	Phase 0. Community Profiles	Phase 1. Baseline	Phase 2. Energy Diaries
Preliminary research Key Informant Interviews Tool development	Community Profiles conducted in each of the thirty (30) research locations	Baseline survey of: - 3000 households - 250 enterprise / institutions Six (6) Focus Group Discussions with Community Members & Small Business in each province	Monthly energy diary phone survey conducted for twelve (12) months with: - 3000 households - 250 enterprise / institutions Qualitative case studies - 10 households or enterprise / institutions - conducted seasonally (four times per year).

Figure 3. Research Overview by Phase

2.1. Community Profiles

Community Profiles were conducted in order to scout the intended locations for a variety of issues or concerns, including:

- High share of potential migrants;
- Security;
- Electrification levels of communities;
- Contacts for ongoing work in communities;
- Socioeconomic characteristics.

As such, the Community Profiling sought to gather basic information on community demographics, market options for energy sources, geography of communities, level of electrification and energy sources commonly used.

A number of communities will experience electrification and grid connection within the next year which could provide fascinating insights as energy patterns change over the course of the longitudinal study	**26 of 30 communities have a majority of households that use biomass (animal waste, wood, mountain thorns, nutshells)** to heat their homes and cook instead of using LPG or electricity. Most of these households collect these fuels instead of purchasing them
Businesses pay more than households on the DABS grid payment scales and the cost of energy greatly limits some businesses' potential for expansion - a fact lamented by interviewed enterprises (for instance metal workers) during the scouting visits.	**Low-capacity solar penetration is very high** in rural communities (almost every household in villages in Daikundi and Paktia), and used to power lights and small appliances

Figure 4. Highlights from Community Profiles

Full details of the Community Profiles can be found at the associated (and continuously updated) project website:
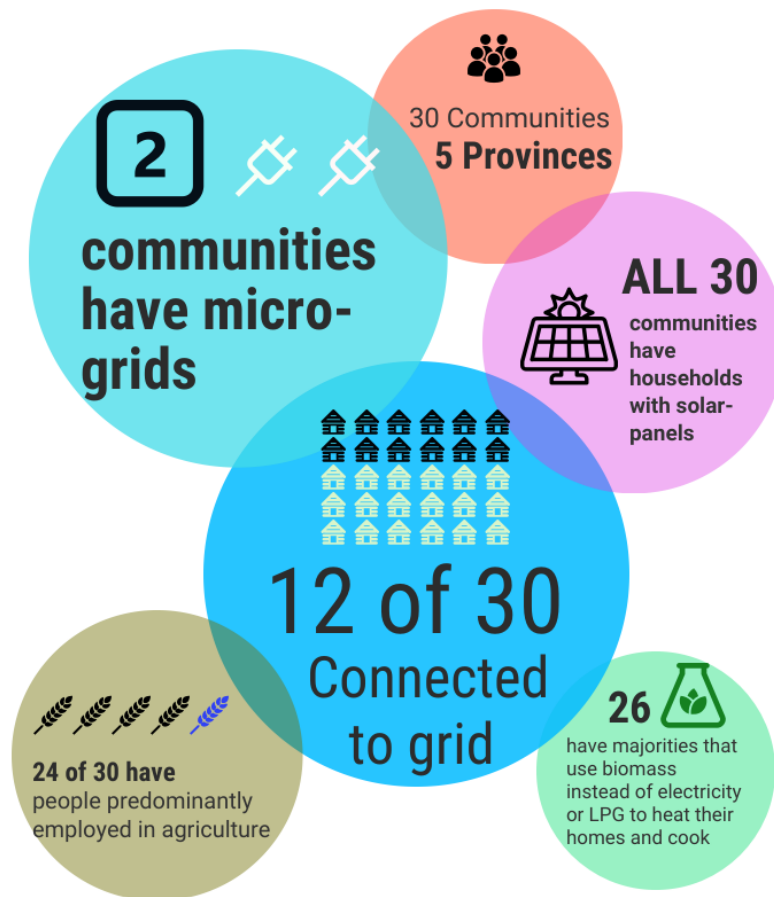
Communities by the Numbers

30 Communities
5 Provinces

2 communities have micro-grids

ALL 30 communities have households with solar-panels

12 of 30 Connected to grid

24 of 30 have people predominantly employed in agriculture

26 have majorities that use biomass instead of electricity or LPG to heat their homes and cook

Figure 5. Communities by the Numbers

2.2. Baseline Survey methodology

The Baseline Survey's quantitative methodology has remained fundamentally unchanged from the original plans in the Inception Report, with some small changes to the qualitative elements.

Quantitative

The Household Survey and Enterprise / Institution Surveys will be deployed across five (5) provinces at outlined in the following table:

	Household Survey	Enterprise / Institution Survey
Kabul	600	50
Herat	600	50
Samangan	600	50
Daikundi	600	50
Paktia	600	50
TOTAL	3000	250

Figure 8. Baseline Quantitative Survey Sample Size

The provinces listed above were chosen for varying profiles in terms in electrification, geography, country of origin for grid power, and anticipated off-grid energy options. This is intended to present a range of experiences in terms of Afghan energy usage. The locations were chosen to represent a divide between rural and urban locations, and to represent secure and accessible locations within these provinces. Within communities, perfect randomness of sampling is limited by the following:

- Lack of access to household listings or census data;
- Lack of access to CSO-defined primary sampling unit information;
- Lack of access to clear and up-to-date detailed (satellite-image) maps of communities.

It was thus decided to conduct sampling based on one of the following scenarios, dependent on the availability of information that can enable each sampling strategy:

Scenario 1	Grid sampling in communities where available maps (satellite or hand-drawn) contain a sufficient level of detail (dwellings, community delimitations);
Scenario 2	Random door-knock sampling starting from selected points in the community (GPS coordinates were recorded during the scouting visits);
Scenario 3	Snowballing / semi-targeted sampling (primarily for the business & enterprise tool).

Figure 9. Sampling Strategy

Sampling for the whole project is dependent upon the sampling conducted in the baseline study, due to the longitudinal nature of the research. Therefore 'sampling' will refer to the strategy used to identify households during the baseline study who will participate also in the year-long diary phase.

The sampling for the Enterprise / Institution Survey will be targeted, aiming for a roughly 50/50 mix of urban and rural Enterprise / Institutions in each province, and particularly seeking to identify 1-2 female-owned or operated businesses in each province. In each province, the research team will aim to profile at least one of each of the following:

Hospital / clinic / medical facility	Government (central or local) building
Mosque	Large business (30+ employees)
School / university	Small business (less than 30 employees)

Figure 10. Target Enterprise / Institution Profiles

It is possible that in some provinces, one or more of the above options will not be available to survey. If this is the case, sampling will focus on identifying businesses across a range of sectors (i.e. an office building, a metal workshop, and a tailor).

2.3. Baseline Pilot and suggested changes to the quantitative tools

Piloting of the Baseline Household Survey[1] tool was conducted the week of February 6, 2018, in two locations within Kabul (one primarily grid-electrified, one without grid connection). This pilot was intended to allow for testing of the tool's length, clarity of terms and concepts for enumerators and respondents, and any other issues with translation or programming of the survey. These are all key considerations which will inform the finalisation of the tool.

Survey length	Length of surveys is a critical consideration. Overly long surveys may have a number of impacts:
	Loss of interest on the part of respondents or failure to complete survey - particularly relevant for this study given that households interviewed within the baseline must also agree to continue being part of the sample for the year to come; **Quality of responses tends to decrease** towards the end of a survey that is too long; **Community buy-in will likely decrease** if households are undertaking long surveys as the opportunity cost is not nil; The pilot testing found that each household had on average ten (8-13) members. The roster section took more than 45 minutes, by which time many respondents lost interest. They were also hesitant to divulge individual information, particularly as pertaining to female household members. Field Coordinators reported that surveys that went beyond 90 minutes, particularly given the detailed nature of the survey, were challenging for the

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[1] Please note that due to the closely aligned nature of the Household and Enterprise / Institution Surveys, only the Household Survey - being the longer and to be more widely used - was tested.

	enumerators because of this. It could also be observed that the number of "I don't know" and "refuse to answer" replies received became more frequent in the latter half of the survey.
Survey content, terminology and concepts	Survey content is critical to test, particularly for technical content like energy. Ensuring that content is relevant can save time, improve data collection and shape analysis. Piloting allows assumptions regarding possible energy mix, knowledge of household energy usage, etc, to be confirmed to some degree before launching the survey. The pilot testing found that the different options regarding energy mix were relatively well understood: ● Respondents are familiar with terms including pico-hydro and mini-grid, and had an understanding of the advantages and disadvantages of different options compared to others. ● Respondents appeared to be well aware also of the potential of Afghanistan's natural resources in this regard "We have plenty of resources, such as Sheberghan gas mine. Wind power should be exploited more, that is quite low cost. Solar devices would be best - they should be distributed by the government" Furthermore, preliminary observations were made as regards energy usage: ● Respondents generally do not make a distinction between cooking and heating in the winter. ● Even near the capital, being connected to the grid often only results in access to electricity for six to seven hours per day. Rechargeable lamps, candles and bukharis were reported as being indispensable. ● The mini-grid connection in the surveyed pilot community only provides energy for a few hours every evening.

Figure 11. Selected Pilot Findings

In addition to these challenges which highlight the need for refinements to the tool, the following were noted from preliminary analysis of the data collected in the pilot and from the observations of the Project team and Field Coordinators, and suggest areas for amendment or improvement of the tools, including better checks for contact information, rethinking of questions on connection fees and the need to shorten the survey.

Not all households are willing / able to provide the research team with a telephone number (let alone two, which is the optimal scenario for the diary phase).	This is a very key finding, but not unprecedented - we will build additional primary filters into the survey to ensure that ONLY respondents who are willing to provide contact information will be surveyed in full.
Photos of walls and ceilings tell us very little about dwellings.	The collection of large quantities of photographic evidence is unlikely to usefully supplement our analysis. Examples may be better collected during qualitative analysis.
Grid connection fees are not widely known: responses in comparable settings varied from AFN 7,000 to AFN 30,000.	Understanding the cost of connection is important, but it is not a useful question if people do not know the answer. This question may need to be re-considered or removed.
People generally do not know how much	Understanding energy usage is important, but it is not a

electricity their household used over the last billing period	useful question if people do not know the answer. This question may need to be re-considered or removed.
No injuries were reported due to energy solutions, lighting or cooking.	A lack of variance in this question suggests that answers might be less informative than hoped for.
There were a lot more 'I don't know' responses towards the end of the survey, including on relatively simple things such as "frequency of wood collection".	This strongly suggests that the length of the survey is inappropriate, and needs to be cut down.

Figure 12: Survey Issues / Areas for Improvement

Building on the above findings, the following changes to the survey tool are strongly suggested:[2]

1. HOUSEHOLD ROSTER: The roster yields little interesting information for analysis, and there is rarely added value in knowing the name, marital status and profession of all household members. It is more reliable and less sensitive (and therefore more likely to be accurately answered) to ask broader questions. For example:
   A. No women were listed as working.
   B. Adding up earnings by individual members leads to a large spread which from an analysis perspective is not necessarily more reliable than asking about the number of household member and total household income.
   C. Questions on decision-making in household expenditure were almost exclusively answered as 'I don't know'.
Furthermore, asking for information about female household members in particular was greeted with considerable reluctance and suspicion, to the point that two pilot surveys were cut short by the interviewee.

2. COMPARATIVE WEALTH: When asked 'how would you evaluate your situation compared to other households in the area' respondent unanimously refused to answer.

3. COMPARING BEST / WORST MONTHS: The question 'how many hours do you not have electricity in a week in the best versus the worst month' yielded little difference in answers - answers do not show much variance and the question requires mental arithmetic inappropriate for the targeted sample cohort.

4. OUTAGES: Outages are always unannounced, as both the findings of the pilot and the research team's observations suggest.

The key major changes should be as follows:

1. **Removal of household roster and replacement with basic household level questions**
2. **Removal of child roster from health section**
3. **Review of questions on expenditure in all sections based on further analysis of pilot data**
4. **Clarification of some terms or questions based on feedback from the field teams**

The final draft tools which have addressed these issues will be provided to the World Bank project team by Wednesday February 20, 2018. Please note that the Enterprise & Institution Survey will also be reviewed and updated to bring it into line with changes made to the Household Survey to ensure the collection of broadly comparable data, and to make use of learnings from the pilot testing and Community Profiles.

Figure 13. Key Major Changes to Survey

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[2] Please note this is not a fulsome list of possible amendments - the final version will all amendments will be provided following this document.

2.4. Qualitative data collection in the profiling phase

The methodology for qualitative research in the Baseline Phase has been updated from that outlined in the Inception Report.

Given the addition of a more extensive Community Profiling to the methodology, the need for CDC / Shura Focus Group Discussions (FGDs) is diminished. As such, it is suggested to replace the CDC / Shura FGDs with Small Business / Enterprise FGDs to supplement specifically the Baseline Enterprise / Institution Survey.

Final sampling for qualitative research will be as follows:

	Community Member FGDs		Small Business / Enterprise FGDs	TOTAL (Province)
	Male	*Female*		
Kabul	2	2	2	**6**
Herat	2	2	2	**6**
Paktia	2	2	2	**6**
Samangan	2	2	2	**6**
Daikundi	2	2	2	**6**
TOTAL (Type)	10	10	10	**30**

Figure 14. Baseline Qualitative Research Sample Size

2.5. Longitudinal Energy Diaries

Over the course of the preliminary phase a number of potential methodologies have been discussed with the World Bank. However, in order to ensure that a significant quantitative dataset is generated - beyond that developed in the Baseline Phase - which allows for comparison with existing World Bank data and some extrapolation of results to other provinces[3], the decision was made to focus more on quantitative data collection during the energy diary phase, rather than qualitative methodologies.

Quantitative: Energy Diary Phone Survey

The energy diary phase will consist of a monthly survey of households or enterprises / institutions which will be conducted by phone. A finalised tool for the phone survey (see Figure 7. Finalisation of

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[3] Please note: it was agreed after discussion with World Bank staff that Samuel Hall would integrate into the survey an asset index comparable to the Afghanistan Living Conditions Survey (ALCS) survey conducted by the World Bank, in order to allow for the association of households in this study with World Bank-developed wealth quintiles, thereby allowing for comparison between the data recorded in this study and that on energy usage collected in previous ALCS.

Energy Diary Phase Research Tools for more information) will be developed after Baseline data collection and analysis, but is currently designed to focus on:

- Energy usage
- Changes in energy access or availability
- Willingness to pay

This will allow for the generation of a quantitative data set on year-long seasonal profile of household energy usage. The period of recall for this diary will be approximately one week - households will be asked to pay attention to their energy usage over the course of one week per month, and then will be asked to report on this in the monthly phone survey.

Qualitative: Seasonal Case Studies

Based on the findings of the Community Member Focus Group Discussions in the Baseline Phase, as well as any relevant findings from the Household Survey, a tool will be developed to explore key issues around the impacts of energy usage on different types of households through the use of a Seasonal Case Study.

Case studies will be conducted across all provinces, with a total of 10 households. Each household that will be studied will be visited four (4) times over the course of the energy diary phase – once each season / approximately every three (3) months. Households will be visited for a few hours by a qualitative enumerator to be interviewed for the case study, and multiple members of the household would be interviewed – preferably at least one male, one female, and one child.

Kabul	Herat	Samangan	Paktia	Daikundi
2 households	2 households	2 households	2 households	2 households

Figure 11. Qualitative Case Study Sampling

Key areas which the case studies will investigate (to be refined based on Phase 1 results) will include:

- Gendered impacts of energy usage
- Impacts of energy usage on education, income generation and health
- Challenges and aspirations

Currently, draft versions or outlines of both tools - the Energy Diary Phone Survey and the Seasonal Case Studies - have been provided to the World Bank and approved. However, these tools will be reviewed, updated and finalised based on the findings of the Baseline Phase, in order to ensure that the tools investigate the most relevant factors, in the most appropriate way, over the course of the year-long Energy Diary Phase.

Final versions of these tools will be provided to the World Bank for approval in advance of the Energy Diary Phase for comment and approval.

Figure 15. Finalisation of Energy Diary Phase Research Tools

3. FIELDWORK LOGISTICS

3.1. Staffing

Dedicated field staff for the project will include a number of profiles. Note that the table below includes full-time Samuel Hall staff as well as dedicated national project staff for field research and community-based resources for the life of the project.

Field Coordinator	Field Coordinators are full-time Samuel Hall staff with extensive experience in conducting research in the field in Afghanistan who train and manage fieldwork teams on a day-to-day basis in the field as well as assisting with field logistics and planning.
Team Leader	Team Leaders are experienced Samuel Hall enumerators who have been trained to act in a supervisory capacity during fieldwork. They support the work of Field Coordinators while field research is ongoing.
Enumerators	Enumerators will be almost entirely local, living in or from the province where they will conduct research. These enumerators will perform the daily work of administering surveys and conducting FGDs.
Community Focal Point	A local community member - one per research location, thirty in total - who will be well-connected to community leaders / wakils and able to act as a point of contact for survey participants, an intermediary for Samuel Hall and participants, and as a form of ongoing field-based oversight as well as a method of ensuring community buy-in.

Figure 16. Field Staffing

In addition, Project Team staff based in Kabul will oversee fieldwork where possible given security and access constraints, and along with Project Team staff in Berlin will manage fieldwork, data checks and data management.

3.2. Security

In addition to the security checks performed so far in verifying locations, an internal security document - called a *Comprehensive Planning Process Report* - will detail risks, mitigation strategies and other relevant details for locations in each project in advance of fieldwork. This document can be shared with the World Bank in advance of fieldwork.

3.3. Workplan

Training
Training will be undertaken on a rolling basis, and conducted by Samuel Hall's experienced Field Coordinators and trained Team Leaders in each province. Training of Team Leaders (who will act as supplemental trainers) and the Kabul team will be conducted first in Kabul, and then deployed in each province. These trainings will be a week-long thorough process to ensure the capacity of

enumerators to explain, work with and complete the survey, and will involve test pilots for enumerator training in all locations.

Timeline

The following timeline assumes the use of **large teams of enumerators (30 per province) with a survey collection target of 3 surveys per day**. (This timeline may be slightly compressed should the survey be shortened.) Please note also that fieldwork will not begin in provinces simultaneously but will be done on a rolling basis with overlap between the fieldwork periods in each province.

	Week 1	Week 2	Week 3	Week 4	Week 5
Kabul	Training				
		Fieldwork	Fieldwork		
Herat		Training			
			Fieldwork	Fieldwork	
Samangan		Training			
			Fieldwork	Fieldwork	
Paktia			Training		
				Fieldwork	Fieldwork
Daikundi			Training		
				Fieldwork	Fieldwork

Figure 17: Proposed Fieldwork Timeline

To begin the fieldwork timeline above, Samuel Hall will require **minimum two weeks from the finalisation and approval of tools to starting fieldwork**. Provided that tools and IR are approved by 21th February 2018, fieldwork will be planned to begin in early March 2018 and conclude in April 2018.

4. DATA SECURITY & MANAGEMENT

Electronic data collection
Data will be collected in the field using Android phones running ODK Collect, the industry standard in open source mobile data collection. Browser based submissions are made through the Enketo platform, also based on the ODK standard. ODK stores survey data on phones until a network connection allows data to be uploaded to the central database. All data transmissions are encrypted end to end using SSL.

Enumerator credentials
Enumerators will be issued individual credentials, thus rendering suspicious or anomalous submissions fully traceable, and enforcing a high degree of data security.

A dedicated secure server

For the purpose of this project, the team will roll out a dedicated data management system (DMS) on Samuel Hall's secure server. All software and data, upon submission, will reside at Google's europe-west3 location in Frankfurt, Germany, subject to German and EU privacy laws, throughout the duration of the project. The DMS will further remain isolated from all other Samuel Hall systems by default.

Data checks

In addition to question responses, the ODK software collects additional data, such as GPS location, beginning and ending times, and IMEI numbers, to assist in data quality monitoring. The control and analytics engine will perform periodic analyses of incremental and aggregate submissions, testing for suspicious or anomalous trends.

A relational database

Accessible to the research team and selected counterparts, the server will host an up-to- date relational database of all submissions from all countries. The database will contain clean, aggregated data in incremental form, updated in real time with each submission.

Data visualization dashboard

The data visualization dashboard will provide privileged users a web-based, point-and- click interface to the database which will allow access to data, cross-sections, slices, summary statistics and visualizations (custom tables and graphs) as well as an interface to download full data-sets or filtrations thereof.

5. REQUIRED INPUTS

In order to move forward as outlined in the timeline above, Samuel Hall will require the following inputs from the World Bank:

Approval of this Addendum (and the changes outlined herein)	**Sunday February 18, 2018**
Final approval of the baseline tools	**Friday February 23, 2018**

Figure 18. Required Inputs for Next Phase

Contacts

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