Inception Report

Household and Enterprise Survey under the Afghanistan Energy Study Project

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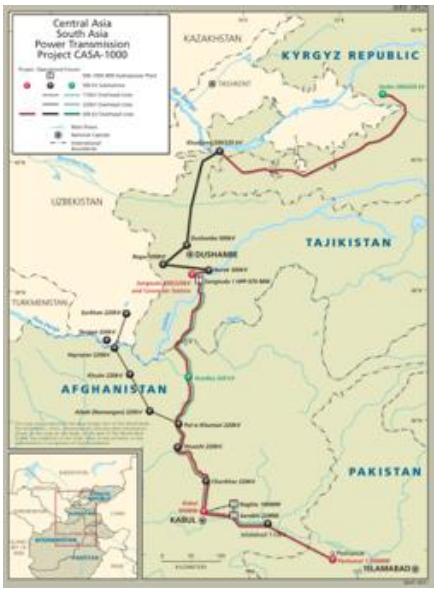
Background

Billions of dollars have been spent on Afghanistan's power infrastructure, and progress has undoubtedly be made. The percentage of Kabul residents who have access to electricity has risen from less than 15 percent to 70 percent since 2002. Still, even in the capital, regular blackouts are a common occurrence. In large parts of the country, dependable access to electricity remains a luxury. This lack of electrification hampers Afghanistan's growth and development. Yet the scope of the logistical challenges to be overcome and investments to be made to improve Afghans' access to electricity are massive, and it is imperative that the economic, financial and welfare benefits to the beneficiaries of such efforts be well-understood.

In this context, the World Bank's *Afghanistan Energy Study* aims to develop a holistic understanding of the gaps and prospects in the energy sector through a series of complementary assessments and surveys. The goal of this exercise is to inform future investments, build capacity at relevant line ministries and contribute to knowledge sharing in a number of key areas.

Figure 1 The CASA-1000 project



One project which should benefit from the exercise is the CASA-1000 project which will transmit some 1,300 MW of power from Kyrgyzstan and Tajikistan to Afghanistan and Pakistan during the warmer seasons (not, however, in the winter). This project will cover the provinces of Kunduz, Baghlan, Panjshir, Kapisa, Parwan, Kabul and Nangarhar. Some of these locations already enjoy a comparatively high electrification rate while others such as Kapisa and Panjshir will be connected to the grid post-2020 at the earliest. What are the energy consumption patterns of households living in these provinces (particularly in rural and peri-urban areas), as well as other locations across Afghanistan? How much do they differ throughout the year? What happens in winter when energy consumption increases to account for heating, while supply drops dues to the non-availability of hydropower? What is households' willingness and ability to pay for electricity?

How much energy do local enterprises of different sizes and in different sectors use, and to which extent does access to electricity have an impact on their operations, scale and growth? What is the energy consumption of local mosques, schools, health centers? What would change for these different actors if energy supply improved?

The "Household and Enterprise Energy Diaries" which comprise activity 3 of the Afghanistan Energy Study will strive to answer these questions.

- **Energy provision in Afghanistan**

Afghanistan so far does not have an interconnected centralized power system; however, interconnection of all grid segments is proposed by year 2032. In addition, there are many decentralized local grids and stand-alone systems such as solar PV and diesel generators providing electricity.

Total installed capacity (not operating capacity) of existing grid-connected electricity generation assets and transmission lines reached about 1,354 MW including imports from Tajikistan, Uzbekistan, Iran, and Turkmenistan.[1] Imports account for about 62% of total grid-connected capacity, while hydropower and thermal (diesel-fired) power plants make up the rest each having about the same share. Another 42 MW of hydro capacity was added when the Afghan-India Friendship Dam started generation and work on another 100 MW has recently started. Currently about 134 MW of decentralized power generators is installed around the country mostly in rural areas, more than half of which is diesel generators.

The government of Afghanistan is now setting targets for increasing electricity supply by expanding domestic capacity for electricity generation as well as increasing imports from Central Asia (Iran, Uzbekistan, Tajikistan and Turkmenistan). Ongoing power projects – Emergency Power Rehabilitation Project, the Kabul, Aybak and Mazar-e-Sharif Power Project, and the Afghanistan Power Sector Development Project have been initiated to provide improved and more reliable electricity through the rehabilitation of distribution networks, transmission lines and selected power plants.

Renewable energy resources such as hydro, wind, solar, and to some extent biomass and geothermal resources are abundant in Afghanistan. Major local, national, regional, and international efforts are underway to increase access to reliable electricity, reduce use of unclean solid fuels for space heating and cooking, reduce the environmental impacts of transportation fuels, increase the share of renewable energy resources, and increase coordination between various stakeholders.

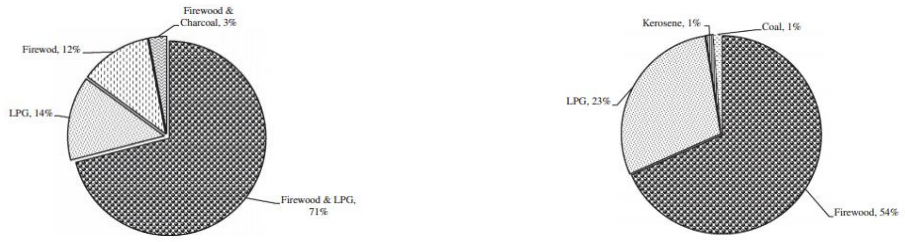
- **Energy consumption in Afghanistan**

Gross electricity consumption in Afghanistan was 178 kWh per capita in 2013.[2] Annual gross demand for the whole country is expected to increase from 3,531 GWh (2011) to 18,409 GWh (2032) and annual peak demand from 742 MW (2011) to 3,502 MW (2032).[3] This growth in demand means that Afghanistan might shortly need about five times more electrical energy than is currently being produced. Only 23.8% of the population was connected to electricity grid in 2013, and this number is projected to reach about 83% by 2032.[4]

[1] CE, Energy Sector Status Summary Report, The Inter-Ministerial Commission for Energy Secretariat, Kabul, Afghanistan, 2016.
[2] CSO, Economy Statistics: Mining and Energy.
[3] Power Sector Master Plan (2013)
[4] ibid

Biomass is still the dominant fuel source in both urban and rural Afghanistan. 79.9% of Afghan residences use solid fuels for cooking while this number is 97.4% for space heating.[5] Urban households use LPG as their primary fuel for cooking while firewood and charcoal are the most important sources of fuel for heating. For rural households, bushes, firewood, and animal dung, in this order, are the most important fuels used for cooking and firewood, and bushes and animal dung, in this order, are the most important fuels for heating.

Figure 2 Share of fuel used for cooking and space heating in Kandahar city



Source: Agha Mohammed, 2013

The residential sector is the largest energy user in Afghanistan with a share of 54% in the total energy consumption.[6] The residential sector also shows the most diversity in terms of various energy sources. Residential energy use generally accounts for an important share in a developing country's total energy consumption, and residential energy consumption and its pattern represent the status of welfare as well as stage of economic development.[7] It has been well established in the literature that the key factors which have a dominant impact on the amount of household energy consumption and ommonly cited factors are household income level, household size, level of urbanization; seasonal variation and climatic location.[8]

To assess the potential impact of a change in the level of energy provision in Afghanistan, it is important to understand the pattern of household energy use and consumption. Improved knowledge on residential energy use is necessary not only to design and implement strategies for securing access to energy but also to address other development goals like eradicating poverty, improving health and addressing environmental concerns[9]

At the same time, a study focusing only on household energy usage would neglect the growing importance of commercial businesses and community institutions. Data on energy consumption for businesses of different sizes as well as schools, mosques and Government offices is needed to to understand productive energy load for non-residential activities.

[5] CSO, National Risk and Vulnerability Assessment (2012)
[6] ADB (2006)
[7] Reddy (2004)
[8] See for instance Barnes, Krutilla, & Hyde (2004); Kowsari & Zerriffi (2011); Pachauri & Jiang (2008); Permana, Perera, & Kumar (2008)
[9] Kowsari & Zerriffi, 2011

Research objectives

The objective of this study is to develop a holistic understanding of the gaps and prospects in the energy sector, with the aim of informing investments to increase accessibility to affordable and sustainable energy. The study will therefore focus on a select number of key areas that will collectively provide both the Government of Afghanistan, the World Bank and other donors a comprehensive understanding of the opportunities, lessons learnt, constraints, and capacity building needs in the sector, as well as provide suitable recommendations. Efforts during the study period will also be made to build and share global experiences with the relevant line ministries through knowledge exchange.

The research questions cover the following broad themes:

Table 1 Research questions

Energy usage and consumption patterns
How much energy do households, enterprises and community institutions use? For what? What is the source of energy in different locations and by different demographics? How reliable is this source of energy? To which extent do different options currently exist, and what arbitrage is used to decide between them? How do energy consumption patterns vary depending on the time of the year? How do energy consumption patterns vary depending on factors such as gender, household demographics and wealth patterns?
Cost of energy, and willingness to pay
What is the current cost of energy for the different target groups? How is energy currently paid for? How much do they stand to gain from improved energy provision? How much would they be willing to / could they afford to pay for said improvement?

In order to answer these questions, **the following tools and methods shall be employed**:

1. **Settlement survey** : Thirty settlement profiles (six per province) will be produced, capturing characteristics such as demographics, economic activity, migration dynamics, infrastructure and, of course, energy sources and usage.
2. **Enterprise / institution survey**: In each settlement, a number of businesses or institutions will be profiled before delving into energy supply, usage, the impact of energy on business activities and willingness and ability to pay for improved access and reliablility.
3. **Household profiling**: 3,000 households (600 per province) will be profiled in terms of household composition, living conditions, economic information (sources of income, debt, spending…) and energy usage of the household.

4. **Focus groups**: Focus group discussions will be conducted in a number of communities in each province with women, men and community elders. They will focus on energy usage and aspirations in this regard but also contain a component of design planning for the diary.
5. **Diaries**: The diary method will be employed to capture households' energy needs and usage over an extended period of time (twelve months). This tool will focus on consumption of energy from different sources and for different purposes as well as expenditure on energy (electricity and fuel).
6. **Monthly recall phone survey**: Diary respondents will be presented with a brief phone survey once a month to validate diary entries and collect additional information regarding their energy use over the past month.

This stocktaking exercise will allow to fill knowledge and data gaps regarding energy usage in Afghanistan.

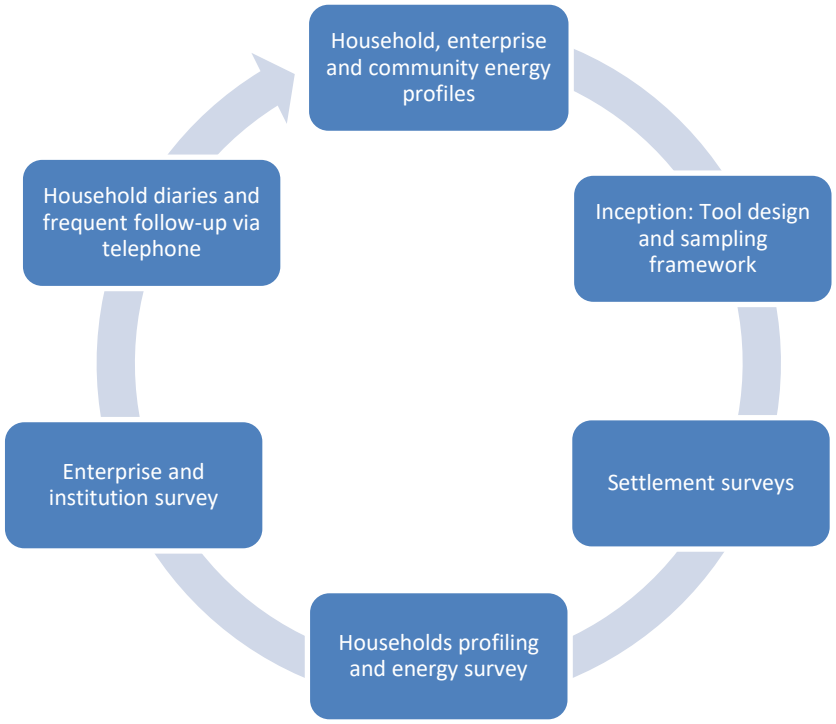
The deliverables for this project consist in

- SPSS data files containing the raw data from all surveys. The data sets will be fully labeled and cleaned and include classifications used in the coding of the data (electronic version)
- Focus group discussion transcripts and recordings, video materials from selected diary-producing households
- Two field work reports (one after the original round of profiling surveys, one after the diary phase) in English describing field work protocols and experiences, including a detailed account of compliance with the sample design and indicators of data quality (realized sample size, sampling, timing, geographical coverage, non-response rate, quality assurance methods and protocols used, issues of concern, problems faced, etc.)
- Two results reports produced at important junctures of the research: one profiling results report containing profiling of communities, households and businesses and one summarizing the results of the diary recording phase.
- A website mapping out key indicators and presenting detailed information/ tabulations on variables of interest.

Methodology

The work to be undertaken includes surveys at the settlement and household level in five provinces. The project will involve following data collection methodology steps and tools:

Figure 3 The way forward



Phase I: Inception

INCEPTION

Currently underway, the inception phase focuses on building the conceptual framework for the research, the finalization of the planned methodology and the tool design. It results in two deliverables: the present inception report presenting the planned fieldwork for discussion with the client, and the tools for the first round of fieldwork.

Timeframe:	August - October 2017
Activities:	» Meetings with WB team and other core stakeholders » First round of Key Informant Interviews » Secondary Desk Review » Development of research tools, sampling plans and fieldwork planning » Training of enumerators and testing of tools
Outputs:	» Inception report (September) » Finalized profiling survey tools (September / October)

- **Key informant interviews and literature review**

Currently ongoing, the key informant interviews and document review are designed to inform the tool design. Key informant interviews with representatives of the following institutions and organizations have been or are planned be conducted:

- Ministry of Energy and Water (MEW) and Ministry of Rural Rehabilitation and Development (MRRD) as key institutions responsible for the development of the energy sector in Afghanistan;
- Ministry of Finance (MoF) and Ministry of the Economy (MoEc) as those mainly concerned with planning and budgeting energy projects;
- SNC Lavalin as experts on CASA-1000;
- A. Mohammad, Energy Department, Kandahar University and published expert on residential energy use in Afghanistan;
- V. Wiseman, Oxford University, expert on the administration of diary surveys in resource-poor settings (will serve as a peer reviewer for the tools).

Over the course of the coming weeks, the lead researcher will also interview stakeholders at UNDP-NABDP, KOICA, JICA, CARE, UNOPs and the Afghanistan Reconstruction and Development Service (ARDS, previously AACA) in order to gain from their experience in the field of energy provision in Afghanistan.

Designed to inform sampling and the themes for the tools, the document review has thus far extended to the following :

Table 2 Documents consulted / requested thus far[10]

Document	Year drafted	Responsible institution(s)
Energy programming		
Energy sector strategy	2008	MEW / MRRD
National Energy Supply Program	2013	MEW
National Water and Natural Resources Development Program	NA	MEW / MRRD / MAIL / MCN
Rural Renewable Energy Policy	2014	MEW
Afghanistan Power Sector Master Plan	2015	MEW
Energy Services Law	2015	MEW
Renewable Energy Roadmap	2016	MEW
Studies informing the methodological framework		
Using diaries to collect data in resource-poor settings	2005	Oxford University
Developing an energy-related time-use diary	2015	University of Otago
Visualizing energy consumption activities	2011	International Journal of Consumer Studies

- **Security assessment and determination of locations of study**

As specified in the Terms of Reference, data collection should take place in five provinces representing all categories in terms of electrification characteristics:

Table 3 Electrification characteristics by province

Electrification rates	Provinces
Highest	Kabul, Herat, Balkh, Kandahar, Kunduz
Expected to grow	Badakhashan, Baghlan, Faryab, Helmand, Jowzjan, Laghman, Nangarhar, Parwan Samangan, Sar-e-Pol, Takhar, and Wardak.
Connection to the grid possible	Badghis, Bamyan, Ghazni, Ghor, Kapisa, Khost, Kunar, Logar, Paktia, Paktika Panjshir, Uruzgan, and Zabul
Connected to Iran	Nimruz
Off-grid solutions	Nuristan, Daykundi, Fayab

[10] Strategic documents, as opposed to general background reading a selection of which is presented in the bibliography presented in a later section of this report

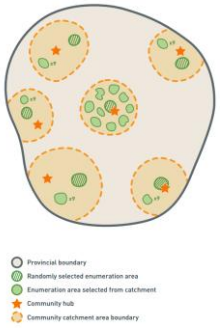
Based on these prerequisites, Samuel Hall field leaders carried out a security assessment to determine not only which locations could be accessed over the next six months for the original round of data collection (household and community profiling, enterprise survey, focus groups) but also, *to the best of current knowledge*, on a regular basis over the course of the following year. The categorization of provinces was conducted through the triangulation of recent research experiences in these provinces and on the basis of a key informant interview with a security expert on Afghanistan.

The following provinces were selected based on considerations of access and security:

Table 4 Selected provinces for fieldwork

Electrification rates	Provinces
Highest	Kabul (pilot province)
Expected to grow	Samangan
Connection to the grid possible	Paktia
Connected to Iran	Herat
Off-grid solutions	Daykundi

Following the identification of the provinces to be visited on a regular basis over the next year and a half, primary sampling units were randomly selected as candidate sites for the sampling procedure outlined in Samuel Hall's proposal.

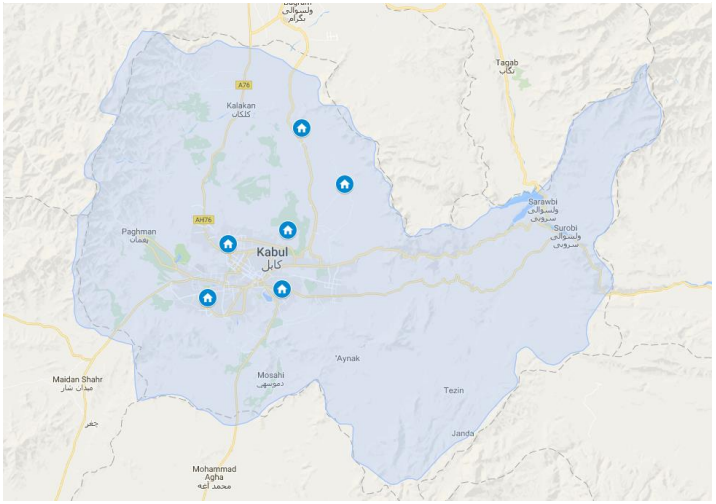


In consultation with INSO (International NGO Safety Organization) contacts, the Samuel Hall security coordinator conducted a comprehensive assessment of potential locations in light of the key risks of negative perceptions of NGO programming among local actors in an increasingly complex local operating environment, the potential of collateral exposer to fighting between opposition groups and Afghan security forces as well as crime.

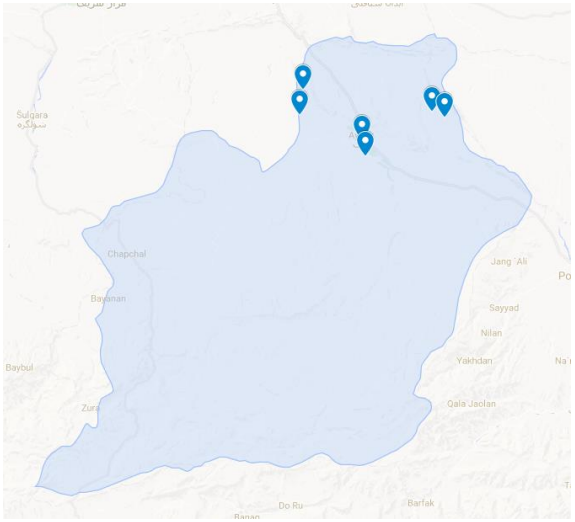
In a context where data collection is not "one-shot" but the same enumerators will return to the same locations /households on a regular basis to collect filled-in diaries (see next section), the risk of obduction also requires a careful consideration. Finally, locations not easily accessible in the winter were eliminated given the timeline of this project.

The following maps present the locations randomly selected among those deemed accessible in August 2017 and which constitute the proposed fieldwork locations. It should be noted that given the length of this project, the accessibility of these locations will be reviewed on a regular basis and some flexibility regarding fieldwork planning will need to be maintained.

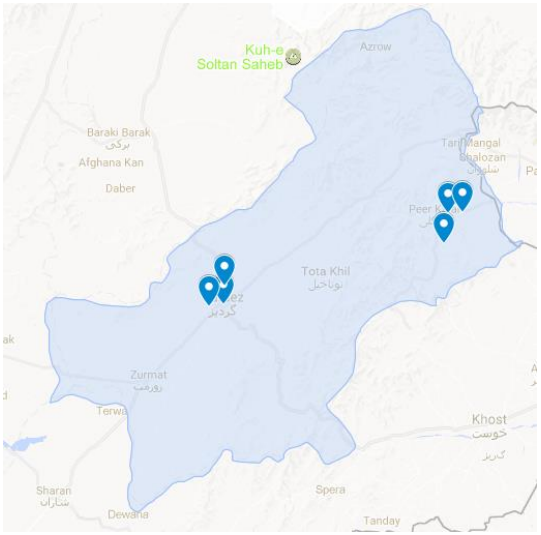
Kabul : Dashtibarchi, Kartinaw, Khairkhana, Sharakimuhajirin, Deh Yahya, Sharaki Mohamdeya



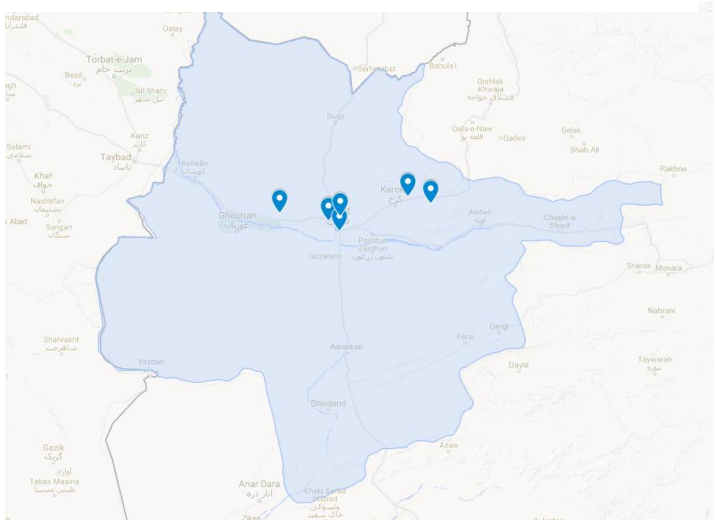
Samangan: Aybak city, Aybak outskirts, Hazrat Sultan (rural and peri-urban), Feroz Nakhchir villages



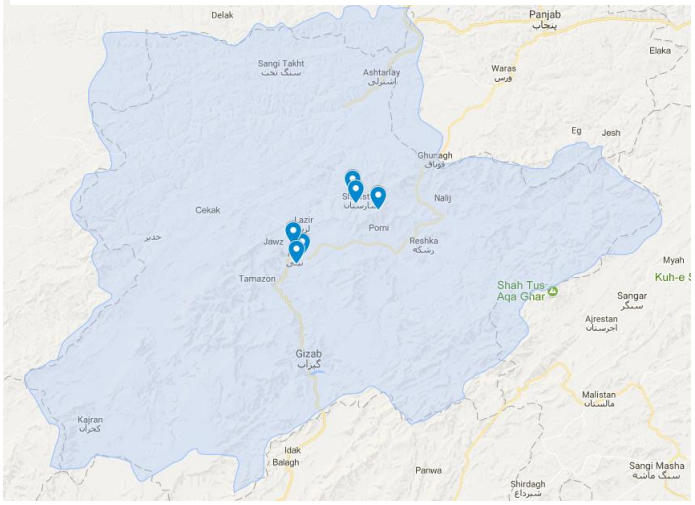
Paktia: Gardez city, Gardez outskirts, Chamkani district center, Chamkani outskirts



Herat: Herat City, Jebrael, Injil, Karokh town, Karokh outskirts, Zinda Jan,



Daykundi: Ghaibi, Qawme Ahmadbig, Higdai, Qarya Charkh, Bande Burlo, Aamich



Next steps

- Tool design, translation, coding and testing

Several tools will be developed based on past Samuel Hall tools (settlement and household profiling, focus group discussion outlines, phone surveys), existing SE4ALL templates[11] (household profiling) and adademic work done notably with regards to energy assessments and diary methods. These are currently in the process of being designed in cooperation with Samuel Hall's academic partners at the *Centre d'Etudes et de Recherches sur le Développement International (CERDI).*

It is estimated that draft tools of the Settlement profiling questionnaire, the Enterprise and Institution survey, the Household profiling questionnaire and the Focus group discussion outlines can be presented to the client in late September 2017. The diary survey tool will be refined in the early stages of household profiling data collection through focus groups in each location of fieldwork.

Upon approval by the World Bank project team, the quantitative surveys will be coded by Samuel Hall's in-house data collection experts. The coded survey will enforce reasonable ranges and sanity checks for all questions and combinations of questions, and will prevent enumerators from continuing interviews until inconsistencies have been resolved.

- Enumerator training

Five provincial enumerator teams will be constituted to conduct this fieldwork, each constisting of a local team leader and six enumerators (two of whom will be female). They will be managed by Samuel Hall's experienced field team leaders.

Upon approval of the first set of tools, the Samuel Hall project manager and field team leaders will conduct a training of trainers in English. The trainers will then be conducting training with the field teams. The teams will undergo a training program of four days to ensure that all members have a shared understanding of the scope of the survey, the sampling technique used, the specific topics under study, survey instruments, and methods to be used, and the outputs expected from them.

[11] Which based on preliminary pilot tests will doubtlessly need to be adapted / shortened considerably to be workable in the Afghan context.

All the research instruments developed for the assignment shall be tested in order to ascertain their suitability in actual field conditions. A senior researcher with the support of a team of field executives will conduct the pre-testing exercise. The feedback from the pre-testing exercise will not only help in identifying problems in the tools but will also be used to address ambiguities and other sources of bias and error. The pre-testing exercise will be conducted for 4-5 days. Based on the experiences from the piloting, the research instruments will be revised and finalized before the launch of actual field-work.

This training and pilot testing should take place in October 2017.

Phase II: FIELDWORK ROUND I

FIELDWORK ROUND I	
The first round of fieldwork will see the implementation of the profiling surveys in the five provinces representing the various energy profiles of Afghanistan. It will involve 3,000 household interviews, 30 community profiles and 300 enterprise/institution surveys. It will result in all collected data and a detailed field report. After the first rounds of focus groups, the diary tool and associated phone survey will be finalized based on respondent feedback.	
Timeframe:	October 2017 – February 2018
Activities:	» Fieldwork in the five provinces, staggered beginning with Kabul and the northernmost locations » Community profiling » Household and enterprise / institution surveys » Focus groups
Outputs:	» Finalized diary survey tool and associated short phone survey » Interview notes » Raw data » Field report #1

Upon finalization of the tools, enumerator training and pilot testing, the Samuel Hall team will conduct data collection in the province of Kabul. This data collection will involve “envoy” enumerators from the other four provinces to allow them to further familiarize themselves with the tools, as well as gain in efficiency prior to the onset of the cold season.

The following numbers will be targeted:

Table 5 Preliminary numbers for quantitative data collection

	Community profiles	Enterprise / institution surveys	Household surveys	Timing
Kabul	6	50	600	October / November 2017
Samangan	6	50	600	November 2017
Paktia	6	50	600	November 2017
Daykundi	6	50	600	December 2017
Herat	6	50	600	January 2017
Total	**30**	**250**	**3,000**	

Data will be collected on mobile phones using the industry standard **Open Data Kit**, to minimize costs and to improve data quality, as well as to ensure that information reaches the central research team with minimal time lag. Ongoing interview results will be monitored in real time by the data collection expert and the project manager, who will be in simultaneous contact with team leaders, advising on referral selection and random selection parameters. Any issues that may arise in the field during enumeration will be promptly shared by the field supervisors with field managers and researchers at Samuel Hall, and the client will be informed of any major complications.

It's Now or Never: Laying the Foundations for a Long-term Panel Study

Experience shows that it is difficult to retain a steady sample with a population notoriously mobile and, oftentimes, badly connected both in terms of communication technology and infrastructure. Systematic record keeping and documentation is critical. Upon obtaining informed consent, subject ID numbers will be attributed and stored along with household profiling information, GPS coordinates and photographic documentation. In order to mitigate risks of sample attrition from the beginning, all available family phone numbers will be collected. The future diary study will be introducted and a household "spokesperson / scribe" will be identified. Informed consent for participation obtained in preparation for the second wave of fieldwork to follow some weeks (in some cases, months) later. In the meantime, the research team will keep track of respondents through periodic phone calls.

The Samuel Hall team will host a series of focus groups discussions (FGDs) to explore the perceptions of targeted sub-segments of the local population with regards to energy demand and supply, as well as in order to design the diary tools. Six focus groups will be held in each province for a total of thirty FGDs. Specific guidelines will be developed for group interviews with 6 to 8 respondents. The focus groups will be based on an open-ended questionnaire lasting approximately 1 hour. Sessions will then be led by one moderator and one note-taker and a total of 150 to 200 people will take part in the discussions. Upon agreement of the participants, discussions will be facilitated by the use of a tape recorder to provide the World Bank with full transcripts of the discussions – *however, it should be noted that, in similar environments, female participants as well as community leaders (maliks in urban and peri-urban centers) are sometimes reluctant to be recorded.*

Table 6 Preliminary numbers FGDs

	Male community members	Female community members (including female heads of household)	CDC / shura members
Kabul	3	1	2
Samangan	3	1	2
Paktia	3	1	2
Daykundi	3	1	2
Herat	3	1	2
Total	**15**	**5**	**10**

In terms of preparing for the Energy Diary phase and the possibility of illiterate respondents, specific issues will be explored in these discussions: first, to identify the relevant range of energy consumption categories; secondly, to identify the products and activities that best symbolized these categories; and thirdly, to confirm that the pictures (drawn by local artists) are easily recognizable by individuals from a range of backgrounds.

Following the first rounds of focus groups in Kabul and two other provinces, the diary survey tool will be finalized.

A note on ethics

The basic principles of respect and non-discrimination form the base of all of Samuel Hall's assessments. Our research team makes every effort to assure that cultural norms and codes of conduct, sensitivity to gender, human rights are respected throughout the survey process. Our experienced enumerators will ensure informed consent and make sure respondents understand the purpose of the assessment and its limitations. Respondents will answer questions on a voluntary basis only and will not receive any direct or indirect material benefit from their contribution, nor will they suffer any onus or retaliation should they decline to participate. At the same time, it should be noted that Samuel Hall teams will apply its standard principles of quality control to ensure that local elites do not manipulate the assessments to serve their own specific purposes, and that the discussions do not create expectations which could bias the answers.

During the fieldwork stage, Samuel Hall researchers will conduct detailed KIIs with local officials (governors, deputy governors, district administrators (*uluswals)* and past implementing partners in energy-related projects in order to identify the type of project deemed necessary and useful in the local context. These interviews will be led using a semi-open questionnaire and will last about 1 hour each. A preliminary list of these key informant interviews will be prepared and submitted for review to the World Bank.

At the end of this first round of fieldwork, the research team will present the client with all collected raw data and interview notes. The associated deliverable will serve as a combined field and and results report. Its detailed field methodology will cover sampling in each location, selection processes and challenges faced during the fieldwork. The results section will present simple frequencies of all the variables of interest as well as disaggregated analyses of all key indicators by geographic location and respondent profiles. Quantitative findings will be triangulated through the analysis of qualitative results. This first of the two main deliverables of this project will be presented to the client in March 2018.

Phase III: FIELDWORK ROUND II

FIELDWORK ROUND II : Diaries

The second round of fieldwork, the Energy Diary Exercise, will commence in March 2018 and last for twelve months. For one week per month, each of the 3,000 households originally profiled will be requested to fill in the energy diary. The field team will call the designated household "scribe"[12] once at the beginning of the week (reminder call) and once at the end of the week (rapid validation survey). Once per trimester, the Samuel Hall enumerators will visit the households to collect the energy diaries. They will then be digitized before being stored.

Timeframe:	12 months
Activities:	» Diary training in all provinces » Regular and rolling phone surveys with all participants » Collection of paper diaries once per trimester
Outputs:	» Interview notes, recordings (where available) » Raw data (paper surveys and digitized) » Final report

[12] Grosh and Glewwe not that school-aged children are sometimes enthusiastic to take on the task of diary keeping, but caution is warranted as they may not have a clear idea of the subjects at hand.

The third stage of this project will last over twelve months. After a training on the diary method with the 600 profiled households and 50 profiled businesses / institutions in each province, the tools will be shared with the respondents. Depending on their individual situation, they will either record their energy consumption / expenditure in writing (the head of household or a literate proxy) or using picture methods.

This exercise will be repeated *daily, for one week per month, over the course of one year.*

Respondents will be reminded to fill in their diaries via telephone a day prior to the start of their "recording period". At the end of their "recording period", they will be re-contacted via telephone and asked to report their energy consumption / expenditure of the previous week (i.e. report the content of their diaries). But the phone survey will also cover additional "sanity check" type of questions which will allow to triangulate the information collected in the diaries.

For a given respondent household / enterprise representative, the routine may look as follows:

- ✓ On the second Sunday of every month, the respondent receives a phone call reminder to start recording energy-related information over the course of the following week;
- ✓ For the following week, the respondent records diary information as agreed;
- ✓ On the third Sunday of every month, the respondent is contacted for a phone survey which asks him to relate recorded information as provide additional data, for instance regarding the weather / heating needs, special events, changes in income, etc.

Nota bene: In order to mitigate the risk of non-compliance with the survey exercise, the respondents will be offered an incentive in the form of monthly mobile phone credit. The exact amount thereof will be determined over the course of the piloting exercise.

For the data collection team, this exercise will be carried out on a rolling basis: 150 households will be asked to write their "enery diaries" in each province one week per month. One per trimester, enumerators will visit the households, collect the filled-in diaries and conduct a brief in-person survey designed to validate results.

Table 7 Diary recording and follow-up for one given province

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	…	➔ Week 52
Cohort 1 (150 housholds)	X				X				Records for 12 weeks
Cohort 2 (150 housholds)		X				X			Records for 12 weeks
Cohort 3 (150 housholds)			X				X		Records for 12 weeks
Cohort 4 (150 housholds)				X					Records for 12 weeks
Businesses / institution representatives	X				X				Records for 12 weeks

➔ A total of 3,000 households and 250 businesses across five provinces will provide diary records for one week per month over one year

This method will allow to lighten the recording burden for each participant, increasing compliance rates, while still allowing to compile a panel data set allowing to monitor changes in energy usage patterns.

After the one-year round of data collection using the diary method and conducting phone surveys, the data analyst will clean all collected data and collate it into an SPSS data set. Tabulations will be made of energy consumption data, expenditure by energy tapy, use and appliance ownership, etc with respect to relevant profiling indicators such as household size and income level, location and profession.

At the end of the second round of fieldwork, the research team will present the client with all collected raw data and interview notes. The associated deliverable will serve as a combined field and and final results report. Its detailed field methodology will cover sampling in each location, selection processes and challenges faced during the fieldwork. The results section will present simple frequencies of all the variables of interest as well as disaggregated analyses of all key indicators by geographic location and respondent profiles. This final deliverable will be presented to the client in April 2019.

Panel attrition

The most well-recognized challenge to longitudinal studies is panel attrition, wherein some respondents in the sample fail to complete subsequent waves. Attrition affects longitudinal studies of all types, modes, and sponsors. The 2008-2009 American National Election Panel Study lost 36% of respondents in less than a year of monthly interviews. At best, attrition reduces effective sample size, thereby decreasing analysts' abilities to discover longitudinal trends in behavior. At worst, attrition results in an available sample that is not representative of the target population, thereby introducing biases into estimates of the outcomes of interest.

Recent expansions in the number and use of panel surveys, coupled with worsening response rates, make the issue of panel attrition particularly salient. It is well-documented that response rates for all surveys, including government surveys in "the West", have been in decline in recent decades (Hillygus et al. 2006). The implications is particularly severe for panel studies since they depend on respondents participating at multiple points in time (Schoeni et al. 2013). Reinterviewing the same panelists is a labor intensive process: researchers must locate, recontact, and persuade the panelist to participate in later waves.

Some researchers simply ignore panel attrition, conducting the analysis on the subset of respondents who completed all panel waves data (e.g., Wawro 2002). In doing so, scholars make an assumption that panel attrition occurs randomly.

While the "loss" of a certain percentage of respondents is to be expected, the research team will mitigate this risk through :

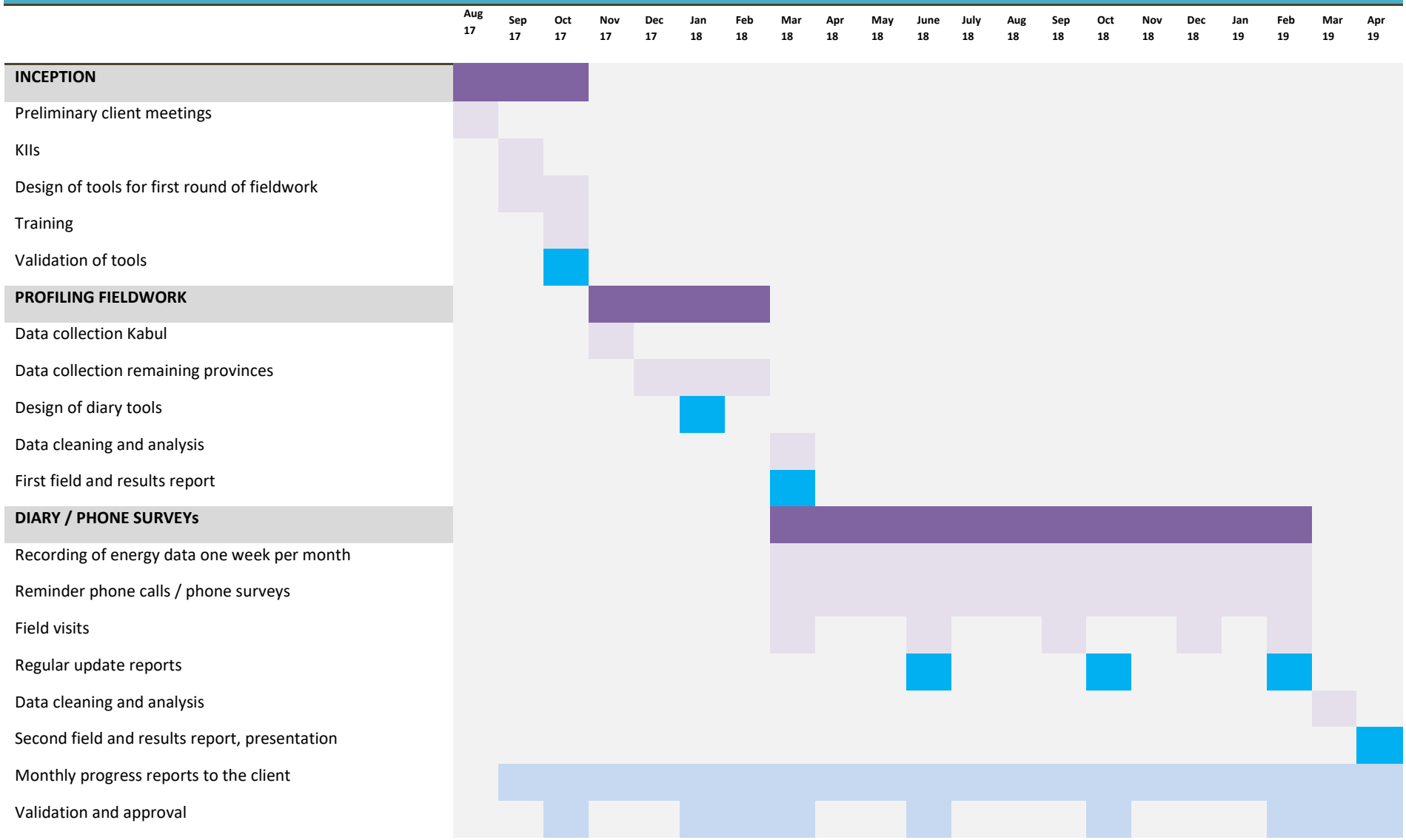
- Complete transparency as to the research objective, informed consent;
- Contact information redundancy;
- Frequent contact via telephone and in person;
- An incentive in the form of mobile phone credit.

The sample attrition which cannot be prevented will be carefully documented and analyses will be performed to detect and, to the extent possible, correct for lost respondents (for instance through imputation, in which the attrited cases are replaced with plausible values (see for instance Pasek et al. 2009; Honaker and King 2010).

A final report and accompanying workshop will provide an overview of all findings and provide recommendations on outreach mechanisms and cost recovery from users across the five provinces.



WORKPLAN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INCEPTION
Preliminary client meetings
KIIs
Design of tools for first round of fieldwork
Training
Validation of tools
PROFILING FIELDWORK
Data collection Kabul
Data collection remaining provinces
Design of diary tools
Data cleaning and analysis
First field and results report
DIARY / PHONE SURVEYs
Recording of energy data one week per month
Reminder phone calls / phone surveys
Field visits
Regular update reports
Data cleaning and analysis
Second field and results report, presentation
Monthly progress reports to the client
Validation and approval

Requested input / support from the World Bank

The successful completion of this ambitious piece of research will rely on close collaboration between Samuel Hall and the World Bank.

1. Samuel Hall research team requests that the WB provide an official letter of introduction from the World Bank to all stakeholders and implementing partners, in order to proceed smoothly with the desk review and qualitative research – the letter should be in Dari, Pashto and English. The consultant can provide an example of letter in all relevant languages.

2. Samuel Hall requests to be granted access to internal documents on energy provision initiatives available to the client, including planning documents and internal assessments and reviews.

3. The research team requests that the client provide assistance where needed to clear administrative obstacles, and contribute feedback in a timely fashion.

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Contacts

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